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A Soil Moisture Budget Analysis of Texas Using Basic
Climatic Data While Assuming A Possible Warming Trend
Across the State

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**A SOIL MOISTURE BUDGET ANALYSIS OF TEXAS
USING BASIC CLIMATIC DATA WHILE ASSUMING
A POSSIBLE WARMING TREND ACROSS THE STATE**

A Thesis
by
BRIAN MATTHEW BJORNSON

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ABSTRACT

**A Soil Moisture Budget Analysis of Texas Using Basic Climatic Data
While Assuming a Possible Warming Trend Across the State (191pp)**

By: Brian Matthew Bjornson, Captain, USAF

Master of Science in Meteorology

Texas A&M University

1990

The soil moisture regime across Texas was estimated using mean monthly precipitation and temperature data from the ten climatic divisions within the state while assuming an increase in temperature. A model was developed to calculate the monthly soil moisture regime across Texas based on 48 years of record and compare it with a predicted soil moisture regime based on a possible warming trend.

A statistical analysis of the data revealed a linear relationship between mean monthly precipitation (MMP) and mean monthly temperature (MMT) existed across the state. The relationship worked best in relatively dry regions of the state between October and May and in all regions of the state during the hot and relatively drier summer months (June through September). The slope of the regression line of MMP on MMT was found to vary across the state and through the annual cycle. Generally, slopes indicate a decrease in precipitation statewide if temperatures are assumed to increase.

A soil moisture profile was predicted using regression equations for the calculation of precipitation and PET as temperatures increased in the model. Only equations which were statistically significant ($p\text{-value} < 0.05$) were used to estimate precipitation as temperature increased 1°F between 1°F and 4°F . The mean monthly precipitation for the 48-year sample was used for months where the relationship was not significant.

Growing seasons, or periods of time in which soil moisture is normally available for plant growth, in many regions of the state were shortened by months as temperatures increased within the model. In all but two divisions, the predicted soil moisture regime would drop to 15% available soil moisture or below during all months of the year if mean temperatures rise 4°F .

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**A SOIL MOISTURE BUDGET ANALYSIS OF TEXAS
USING BASIC CLIMATIC DATA WHILE ASSUMING
A POSSIBLE WARMING TREND ACROSS THE STATE**

A Thesis

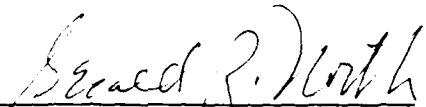
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ABSTRACT

A Soil Moisture Budget Analysis of Texas Using Basic
Climatic Data While Assuming a Possible Warming
Trend Across the State. (May 1990)

Brian Matthew Bjornson, B.S., University of Texas at Austin

Chair of Advisory Committee: Prof. John F. Griffiths

The soil moisture regime across Texas was estimated using mean monthly precipitation and temperature data from the ten climatic divisions within the state while assuming an increase in temperature. A model was developed to calculate the monthly soil moisture regime based on 48 years of record and compare it with a predicted soil moisture regime based on a possible warming trend.

A statistical analysis was performed to investigate for possible relationships between mean monthly precipitation (MMP) and temperature (MMT) for each division during all months of the year. Regression statistics revealed that a statistically significant linear relationship existed between MMP and MMT in just over half the cases (63 out of 120). The relationship worked best in relatively dry regions of the state between October and May and in all regions of the state during the hot and relatively drier summer months (June through September). The slope of the regression line of MMP on MMT was found to vary across the state and through the annual cycle. Generally, slopes indicate a decrease in precipitation statewide if

temperatures are assumed to increase. The most significant decline in precipitation occurs in south and southeastern Texas, especially in summer, and become less significant toward the north and west.

A control soil moisture regime was estimated using mean monthly precipitation data and estimates of monthly PET. Infiltration was assumed to occur at 100% until field capacity (4 or 6 inches of net soil water) was reached. The mean percent soil moisture profiles are plotted for each division (only for divisions where soil moisture is above 0% during any month) for all months of the year.

A soil moisture profile was predicted using regression equations for the calculation of precipitation and PET as temperatures increased in the model. Only equations which were statistically significant ($p\text{-value} \leq 0.05$) were used to estimate precipitation as temperature increased 1°F between 1°F and 4°F . The mean monthly precipitation for the 48-year sample was used for months where the relationship was not significant. Results were plotted on the same graphs as the control profile for easy comparison.

Growing seasons, or periods of time in which soil moisture is normally available for plant growth, in many regions of the state were shortened by months as temperatures increased within the model. In all but two divisions, the predicted soil moisture regime would drop to 15% available soil moisture or below during all months of the year if mean temperatures rise 4°F . If temperature increases are on the high side of GCM predictions ($+ 8^\circ\text{F}$ for some locations) the resulting scenarios would likely be much worse than indicated here.

DEDICATION

This manuscript is dedicated to my wife, Donna, my parents, Donn and Stella, and my brother David. Their love and support throughout my life has given me the proper mind frame to accomplish and exceed all my goals. Thanks mom and dad for guiding me through my early adult years and for affording me the opportunity to serve this wonderful country of ours. Thanks David for helping me rediscover the "Light" that shines brightly in our family; for without "Him" none of this could be possible. Biggest thanks to you Donna for the love, friendship, and support you have given me during this and all other challenges we have faced together.

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CHAPTER I

INTRODUCTION

A. General

While precipitation amounts are one of the most common climatological elements supplied to the farmer, what really counts is how much enters the soil (Musgrave, 1955). The role of soil moisture in the hydrological cycle must be evaluated properly to obtain a comprehensive understanding of the relationship between weather and plant growth. Such studies are of practical importance to agriculturalists because the results can be applied to many weather-sensitive agricultural problems in which moisture is of utmost concern, such as explaining variations in crop production, estimating crop yields on a pre-harvest basis, and defining agroclimate zones (Baier, 1965).

Rainfall in Texas is not evenly distributed over the state and varies from year to year. A large portion of the annual rainfall occurs within short periods of time from intense convective storms. This reduces infiltration into the soil which results in increased runoff and soil erosion (U.S. Department of Commerce, 1978). Musembi (1984) stated that total monthly rainfall amounts are insufficient and possibly misleading for assessing the agricultural potential of an area. According to Baier and Robertson (1968), however, soil moisture bears a closer relationship to plant growth and crop production than any single meteorological element.

The citations on this and the following pages follow the style of *Journal of Applied Meteorology*.

In Texas, drought means various things to various people. To the agriculturalist, drought may be defined as a condition in which sufficient soil moisture is unavailable in the root zone for plants to grow and develop (Palmer, 1965). An evaluation of drought on a purely agricultural basis must therefore take into account the crop variety, the stages of growth and rooting depths, the soil characteristics, the duration of drought, and the size of the affected area (U.S. Department of Commerce, 1978). Decker (1985) defined drought risk as the time soil moisture reaches a critically low value which would hinder adequate growth of a particular crop.

Droughts are often associated with higher than normal surface air temperatures. There is a clear association between dry weather and higher than normal temperatures during the summer and a less strong but still apparent dry-warm association during the winter across the United States as a whole (U.S. Department of Commerce, 1988). This dry-warm association is evident across Texas during most of the year.

B. The Problem

The by-products of fossil fuel combustion and industrial development are changing the earth's atmosphere. One of these by-products, carbon dioxide (CO_2), is a natural component of the atmosphere which exerts a warming effect because of an increase in abundance. It is difficult to estimate CO_2 levels for the future but many scientists speculate that CO_2 levels will double over the next 100 years from levels experienced in the late 1800s (Idso, 1989). Some scientists attribute the overall rise of 1°F in the earth's mean

temperature over the past 100 years to increasing levels of CO₂. They believe that further increases of CO₂ will lead to more drastic temperature increases by early in the twentieth century (Texas Department of Agriculture, 1988). Climate models disagree in their predictions for the magnitude of mean temperature increase the earth may experience in the future. Many models place the degree of warming at about 5.5 +/- 2.5 °F for a doubling of CO₂ levels in the atmosphere (Kellogg and Zhao, 1988), while others believe the warming, if any, will be significantly less (Brookes, 1989).

A secondary effect of such warming is a change in precipitation patterns. Present Global Climate Model (GCM) knowledge does not allow for an accurate prediction of precipitation changes on a regional level. However, increases in evaporation and transpiration resulting from higher temperatures will likely reduce the availability of water in most of Texas. An increase in the frequency and severity of droughts as a result of a decrease in precipitation across the state is possible (Texas Department of Agriculture, 1988).

The extent to which soil moisture and soil moisture patterns will be affected as a result of any rise in global temperatures, not only 'Greenhouse type', is of utmost concern to the agriculturalist and hydrologist. Increasing temperatures will increase the demand for water at a time when precipitation is expected to decline. Dryland farming may become more of a risk. Irrigation techniques may fare no better if temperature increases are on the high side of model predictions. At the same time that more water is needed to

maintain crop yields, surface and groundwater sources may decline, thus reducing water availability (Texas Department of Agriculture, 1988).

To test the efficiency of any soil moisture technique, estimates should be correlated with observed soil moisture data or with appropriate parameters of plant response to climate such as growth, development, and quantity or quality of crop yields (Baier and Robertson, 1966). However, direct measurements of soil moisture present several difficulties and provide only point readings, whereas soil moisture varies considerably from point to point because of variations in the soil. Although improvements in design and operation of soil moisture instruments and techniques have been made, there is no simple and reliable method suitable for determining soil moisture under all conditions and in all soils (Baier, 1965). Furthermore, soil moisture budgets derived from observed soil moisture data do not exist on a monthly basis. Since the primary goal of this study is to predict the monthly soil moisture regime across Texas based on a possible warming trend, results from this study cannot be correlated with actual monthly soil moisture data.

The prediction of changes in the soil moisture patterns in Texas which results from a possible future of warmer temperatures is an essential step toward planning Texas agriculture in the next century. This research is intended to aid the agriculturalist in developing a plan to meet a changing climate associated with any possible warming trend in Texas.

C. Objectives

The fundamental goal of this research is to determine the soil moisture regime across Texas using basic climatological data while assuming an increase in temperature. The objectives of this study are to:

- (1) Establish the spatial and temporal relationships between mean monthly temperature and mean monthly precipitation within Texas.
- (2) Develop a method for estimating the present soil moisture regime from evapotranspiration, temperature, and rainfall.
- (3) Determine future soil moisture patterns for Texas based on a possible warming trend across the state.

D. Literature Review

Progress has been made in the study of relationships between soil moisture and crops, but large scale applications of local experimental results have been impossible because of the lack of adequate soil moisture data. To ease the problems encountered with direct soil moisture measurements, meteorological methods for estimating soil moisture from weather data were proposed in the early 1960s (Baier and Robertson, 1966). Baier and Robertson (1968) showed that crop yields were more closely related to estimated soil moisture than observations of rainfall and maximum and minimum temperatures. Furthermore, they found that yield components of a wheat crop, namely number of heads per unit area and number of kernels per head, were related to soil moisture estimated from a meteorological budgeting procedure using only standard climatic data (Baier and Robertson, 1967).

Estimates of soil moisture from meteorological budgeting techniques have proven successful for irrigation planning and for agroclimate classification purposes. Thornthwaite (1953) suggested a simplistic method for scheduling time and rate of irrigation based on daily estimates of potential evapotranspiration (PET). Starting with a known soil moisture content, the daily values of PET were subtracted from daily rainfall and the result was subtracted (or added when the rainfall exceeds PET) from the moisture present in the soil to give the new soil moisture storage. This process was repeated on a daily basis until the moisture content either reached field capacity or fell to the permanent wilting percentage in the event of drought. Although there is extensive literature on PET and soil moisture budgeting methods for scheduling irrigation, very little exists relating to the use of meteorological data for the estimation of soil moisture under dryland conditions (Lowther, 1989).

The permanent wilting point is the percentage of soil moisture content at which plants permanently wilt. Typically, this value is about 15 bars tension for most crops, but is also dependent on the soil and crop variety. Field capacity is the amount of water a soil will hold against gravity when it is able to drain freely (Keese, 1984).

Infiltration is defined as the process of water entry into the soil, generally by downward flow through all or part of the soil surface. The rate of this process, relative to the rate of water supply, determines how much water will enter the root zone, and how much will run off. Thus the rate of infiltration affects not only the water economy of plant communities, but also

the amount of surface runoff (Hillel, 1982). Linsley and Franzini (1979) state that the nature of the soil, its condition, the nature of rainfall, and the season of the year determines infiltration. According to Bruce and Clark (1966), the infiltration rate is dependent upon the physical characteristics of the soil and its initial moisture content, upon the vegetation cover and slope of the ground surface, and upon the rainfall characteristics. Percolation, which is the movement of water within the soil, is closely related to infiltration in that infiltration cannot continue unimpeded unless percolation provides ample space in the surface layer for infiltrated water (Linsley et al., 1975).

Interception is defined as the precipitation that collects on a vegetative canopy and either evaporates or reaches the ground as stem flow (Terstriep, 1985). Linsley et al. (1975) estimated that interception by forest or other dense cover equates to 25% of the annual precipitation. In general terms, when precipitation reaches the ground, it may be retained there, infiltrate into the soil, or flow overland to a stream channel. This latter process, known as surface runoff, occurs when the precipitation rate exceeds the rate of infiltration into the soil (Bruce and Clark, 1966).

Actual evapotranspiration (AET) is the loss of water into the atmosphere through evaporation from all surfaces and transpiration by plants (Griffiths, 1982). Values of AET are not known with much accuracy, although they are sometimes extrapolated from theoretical considerations or lysimetric observations limited to very small areas. AET has undergone intense study, yet it remains the most obscure of the hydrological components (Knapp, 1985). Most soil moisture budgeting techniques differ mainly in the

way water is removed from the soil under conditions where soil water supply is unlimited. The most common technique is using potential evapotranspiration (PET), which is always greater than or equal to AET, but estimates of PET are more easily obtained (Baier, 1965). Because of the necessity for estimating PET over large geographic areas and over a period of time, direct measurements are not practical. Griffiths (1982) stated that evaporation from an open water surface (E_0) presents a more uniform or standard surface than soil or vegetation and is therefore more applicable for meteorological studies.

Moe and Griffiths (1965) found that product-moment correlation coefficients of mean monthly maximum temperature with monthly evaporation (ME_0) in Texas were 0.95 or greater in most cases. Linear regression equations expressing the relationship between mean monthly maximum temperature and evaporation were found to vary across the state. By plotting isopleths for the slope and E-intercept of the regression lines on maps of Texas, they developed a simplistic method for determining monthly evaporation rates across the state. Penman (1948) developed a method for estimating PET and found that the relationship of PET/E_0 varied from 0.6 to 0.8, being higher in the summer due to greater amounts of advected energy during that season. Lowther (1989) modified these values to 0.7 in the winter to 0.8 in the summer to fit the Texas climate. According to Monteith (1973), Penman's ratios are valid within +/- 15% on a monthly scale for most temperate climates.

According to Griffiths (1982), the relationship of AET to PET is problematic and subject to much discussion in the literature. Baier (1965) stated that when a soil dries out, the water supply to the plant root and to the soil surface is reduced sharply and the rate of AET falls short of PET depending on soil and plant characteristics. Derendinger (1971) stated that there is a threshold level above which AET is controlled by atmospheric conditions, and below which is controlled by soil characteristics. It is generally agreed that water is available to plants over the range from permanent wilting to field capacity, but there is disagreement about the rate of availability over the whole range. Van Bavel (1953) and Veihmeyer (1956) argue that evapotranspiration proceeds at a constant high loss rate at all times, even when soil moisture is near the wilting point. Thornthwaite and Mather (1955) state there is a linear relationship between AET and soil moisture content over the range of field capacity to the permanent wilting point whereas Pierce (1958) claims there is no substantial reduction in the AET/PET rate except in very dry soils. Finally, Holmes and Robertson (1963) state that AET proceeds at the PET rate up to a point depending on depth and concentration of roots, then drops off significantly depending on soil type.

Karl and Young (1987) refer to two aspects of drought. The first pertains to the hydrological drought or a long-term water deficiency in deep soil profiles. It is important with respect to regional, municipal, and local water supplies used for domestic, commercial, and industrial processes. The hydrological drought requires at least several months of dry weather in order to develop. The second aspect, the agricultural drought, pertains to a short

term moisture deficiency in shallow plant-root zones. It occurs whenever the vegetation of an area is stressed due to an inadequate or below normal supply of moisture. Unlike the hydrological drought, an agricultural drought can develop within weeks.

Droughts are often associated with higher than normal surface air temperatures. Karl and Quayle (1981) determined that the correlation between hot and dry summers becomes apparent in the interior and southeast portions of the U.S. The South Atlantic and West South-Central regions have the highest frequency of very hot summers occurring concurrently with very dry summers. Furthermore, they found that an abnormally high percentage of sunshine was observed across the U.S. during the summer drought of 1980. Bergman et al. (1986) found that the 1986 drought in the southeastern U.S. came at the most critical time of the annual agricultural cycle. Failure of the winter and spring rains provided inadequate soil moisture for proper crop growth at a time when even normal summertime rains can barely keep up with high summer evapotranspiration rates in the best of circumstances.

Palmer (1965) developed a numerical approach for objective evaluation of meteorological drought. Drought was evaluated as a meteorological anomaly characterized by a protracted and abnormal moisture deficiency. A method was presented for evaluating this anomaly in terms of a single number, the Palmer Drought Index (PDI). The PDI uses precipitation and temperature data for a region to depict prolonged abnormal dryness or wetness. It responds slowly and changes little from week to week (Felch,

1978). Palmer (1968) also developed the Crop Moisture Index (CMI) to evaluate present moisture supply status in relation to moisture demand. The CMI is applicable for measuring the short term, week to week states of dryness or wetness affecting mostly warm season crops.

Karl and Young (1987) suggest there is no evidence that the 1986 drought in the Southeast was a result of increasing carbon dioxide or other trace gases. Recurrence intervals for the 1986 drought are not sufficiently long to make them inconsistent with twentieth-century climate records. They conclude that the agricultural drought during the growing season was intense and even rare for a few selected areas, but does not necessarily imply a semipermanent change to a new climate regime.

The fact that soil moisture is considerably more important than temperature in determining where plants can grow has dictated a number of studies of soil moisture changes possible if the earth grows warmer (Kellogg and Zhao, 1988). Manabe and Wetherald (1986) used an atmospheric general circulation model (GCM) coupled with a static mixed ocean layer model to investigate the change in soil moisture if the mean global temperature increases in the future. Their results showed that soil moisture decreased in both summer and winter across the U.S., except for the northern third of the U.S. in the winter, where soil moisture increased. Meehl and Washington (1988) compared present and future soil moisture regimes based on a proposed warming trend as predicted by two GCMs. They found that the models differed in their prediction of soil moisture in both the present and future cases. Because of the highly parameterized nature of hydrology in both models and

the lack of appropriate observed data, the authors concluded that one model underestimated summer dryness due to warmer temperatures while the other overestimated summer dryness. Kellogg and Zhao (1988) compared results from five current state-of-the-art GCM experiments (from the GFDL, GISS, NCAR, OSU, and UKMO models) in an attempt to study regional soil moisture changes over North America assuming a temperature increase in the future. All five models used a similar soil moisture budget equation over land (similar to the equation used in my research), while only three of the models accounted for soil moisture changes over snow-covered areas. Furthermore, the models relate temperature and PET but the authors fail to indicate how these parameters are related. Results showed that during the winter there may be an increase in soil moisture across the northern tier states and Canada while an onset of drier conditions affects the south (Fig. 1). During the summer, there may be a shift toward drier conditions in the mid-west while the Gulf and West coasts experience wetter conditions (Fig. 2). Averaging the results of all five models showed slightly different results. A decrease in soil moisture for the summer across most of the U.S. except the Pacific Northwest is expected while during winter months soil moisture reductions are predicted from Baja, California to the mid-Atlantic coastal states (Figs. 3 and 4).

Washington and Meehl (1989) ran three simulations on an updated version of the National Center for Atmospheric Research (NCAR) Community Climate Model: a control simulation holding global temperatures constant at present values, one with an instantaneous increase of global temperatures, and another with temperatures gradually increasing over a 30-year period.

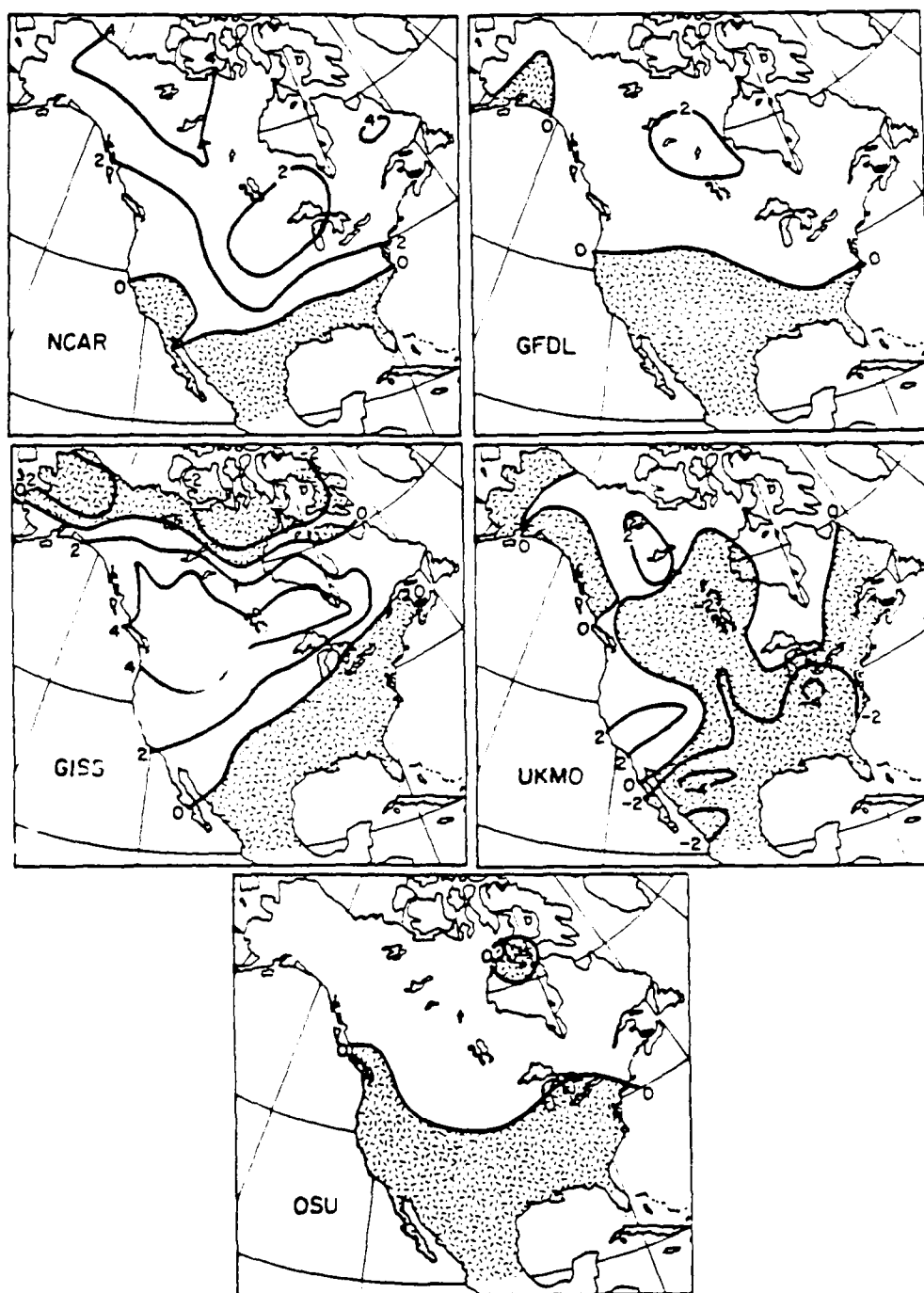


Figure 1. Increases and decreases of soil moisture in winter (in centimeters of water) relative to the control case. Shaded areas indicate a decrease in soil moisture or change to drier conditions; clear areas show an increase (adapted from Kellogg and Zhao, 1988).

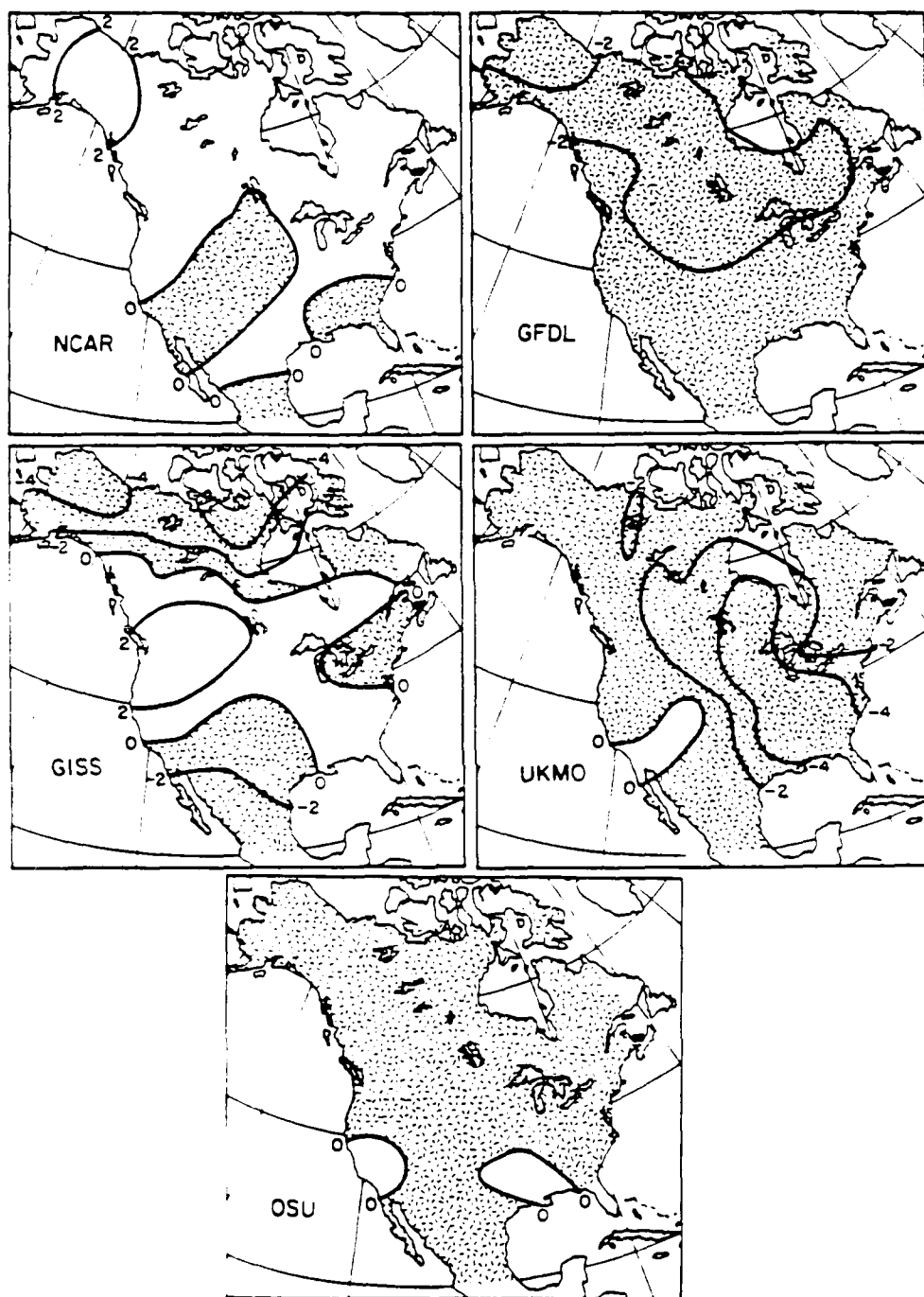


Figure 2. Increases and decreases of soil moisture in summer (in centimeters of water) relative to the control case. Shaded areas indicate a decrease in soil moisture or change to drier conditions; clear areas show an increase (adapted from Kellogg and Zhao, 1988).

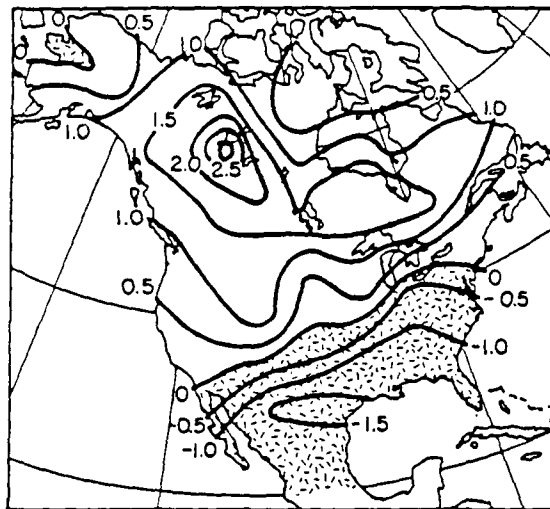


Figure 3. The averages of the changes in soil moisture of the five models for winter. Areas shaded with hen-scratches indicate a decrease in soil moisture; clear areas show an increase. Units in centimeters of water (adapted from Kellogg and Zhao, 1988).

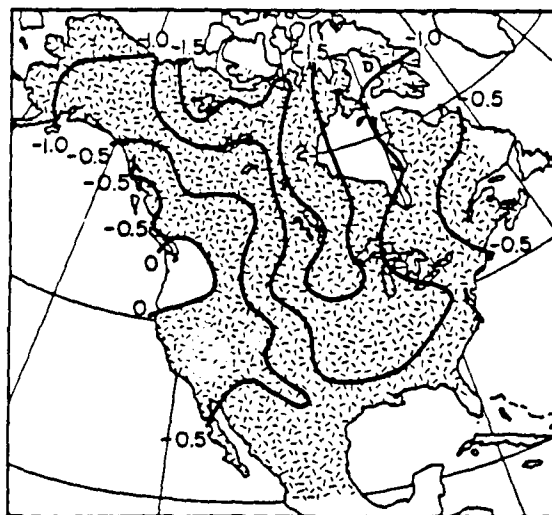


Figure 4. The averages of the changes in soil moisture of the five models for summer. Areas shaded with hen-scratches indicate a decrease in soil moisture; clear areas show an increase. Units in centimeters of water (adapted from Kellogg and Zhao, 1988)

This updated version contained a more sophisticated ocean general circulation model (coarse-grid ocean) as opposed to the simplistic ocean model (slab) used in previous versions. Contrary to past predictions from this model, the updated version predicted that soil moisture will increase across Texas during the winter and decrease during the summer for both the instantaneous and transient cases.

In general, when the mean global temperature is assumed to increase, most of the models indicate decreases in soil moisture for Texas during the summer and winter months. However, great caution must be exercised when assessing these results. Schlesinger and Mitchell (1987) conclude that "there is an inherent limitation in our ability to validate the accuracy of GCM perturbation simulations, which thereby affects our confidence in the accuracy of the GCM simulations of CO₂-induced climate change." Neeman et al. (1988) added that even if a model simulates observed parameters of the present climate accurately, there is no guarantee it simulates climate sensitivity correctly. Finally, Kellogg and Zhao (1988) state that precipitation and soil moisture are secondary features of the general circulation and depend on a complex sequence of interaction of flow patterns, storm tracks, convective activity, and so on. Thus, the hydrologic cycle is much more difficult to model, and results must therefore be viewed with caution until they can be checked with greatly improved climate models.

Land and Schneider (1987) state there is an alternative to the use of climate models in predicting future behavior of the climate system. By employing empirical statistical methods, such as regression equations, with

past and present observations one can predict future climate behavior. Schneider and Rosenberg (1988) add that climate prediction is essentially a process of extrapolation. Regression equations based on past data can be used to extrapolate what will happen in the future. However, assumptions must be made when applying regression equations based on historical data to a future that may not experience previously observed conditions or in which conditions are caused by different atmospheric processes.

CHAPTER II

AREA, SOURCES, AND LIMITATIONS OF THE DATA

A. Climatic Area

Texas covers 430,148 square kilometers (km^2) in area or 7.4 percent of the nation's total area and is the largest of the conterminous states, exceeded in size only by Alaska. Texas extends from latitude $25^{\circ} 50' \text{ N}$ to $36^{\circ} 30' \text{ N}$ and from longitude $93^{\circ} 31' \text{ W}$ to $106^{\circ} 38' \text{ W}$, which equates to about 1290 km from north to south and 1245 km from east to west. To compensate for the large geographic and climatic differences within Texas, the National Weather Service divided the state into ten climatic divisions which are very similar to the Crop Reporting Districts used by the U.S. Department of Agriculture (see pages 22, 24, and 25). Changes in climate from one division to the next are gradual (Griffiths and Bryan, 1987).

Texas encompasses a wide variety of weather regimes since part of it fringes on the tropics and part of it lies along the southern edge of the mid-latitude westerlies. The persistent southerly and southeasterly flow of warm tropical maritime air (gulf moisture) into the state from around the westward extent of the subtropical high further complicate the climatic differences imposed by nearly eleven degrees of latitude within the state. The increase in elevation from southeast to northwest adds one additional complication to the understanding of the already wide diversity of Texas climate.

Maritime tropical, maritime polar, continental tropical, and continental polar air masses influence Texas weather during various times of the year.

Intrusions of tropical air are common throughout the year in Texas, though the eastern half of the state is affected more often by maritime tropical air than is the western half. Penetration of maritime polar air is more common during spring and autumn than that of continental polar air. Air mass changes are most common in Texas during late winter and early spring. On average, 25 cold fronts penetrate most areas of the state between January and April. The majority of these frontal systems are continental polar or maritime polar in nature (Bomar, 1983).

B. Errors in Measurement

In a study of this nature, the errors involved in measurement must be considered. Mean monthly precipitation and temperature data for Texas contain both sampling and observational errors.

Over 14,500 rain gages at some 13,000 stations are employed across the nation by the U.S. Weather Bureau (U.S. Weather Bureau, 1960). This equates to an average density of one station per 370 km². For climatological studies, the U.S. Weather Bureau calls for one gage per 1000 km², of which about four-fifths should be in operation. This equates to one working gage for every 1250 km² (Chow, 1964). Texas has over 350 stations with rain gages or one gage for every 1200 km². Table 1 shows the number of stations with rain gages for each climatic division (see pages 22, 24, and 25) together with the average number of square kilometers per gage for two different years within the data sample used for this study. Considering the convective nature of most precipitation in Texas, this method of measurement across divisions is

poor. The probability that the average amount of precipitation which falls over an area is centered over a gage is very small, even though additional stations have been added in recent years.

Table 1. Number of stations with rain gages (top lines) and area in square kilometers per gage (bottom lines) for Texas and its climatic divisions for the month of December for the years 1956 and 1988.

Year	Climatic Division By Number										Texas
	1	2	3	4	5	6	7	8	9	10	
1956	31	23	51	35	16	22	27	27	13	9	254
	2045	1745	1215	1530	3620	2575	1290	725	2610	530	1690
1988	47	33	62	40	41	38	38	25	20	11	355
	1350	1225	1015	1335	1415	1500	920	785	1690	435	1210

Lowther (1989) states that since the area of Texas is so large, and because much of the precipitation that falls is of a convective nature, care must be exercised when interpreting the results of a study involving soil moisture budgeting techniques which use precipitation as the main climatic element. However, since it is believed reasonable to assume that measured precipitation represents the lower limit of the precipitation regime, the results of this type of study should provide a reasonable scenario as to the amount and distribution of the precipitation for a region.

Errors involved in the measurement of air temperature are equally important. Platt and Griffiths (1964) state that the most important source of error in measuring air temperature is the effect of radiation on the thermometer. In order for a thermometer to have the same temperature as the air, it must be protected from all kinds of radiation that it can absorb but which air cannot. Despite careful details in the design of instrument shelters, on calm, clear days of intense sunlight the air in the shelter may acquire a temperature as much as 4°F higher than the actual air temperature, owing to radiation absorbed by the shelter. On clear, calm nights, the shelter may lose enough heat by radiation loss to make its temperature lower than that of the air (Byers, 1974). To minimize this kind of error, Platt and Griffiths (1964) state that there must be reasonable ventilation through the shelter to insure the thermometer indicates a more representative temperature.

C. Basic Data

Figure 5 shows the ten climatic divisions of Texas. Monthly averages of temperature and precipitation for these divisions for the 48-year period between 1941-1988 were used for this study. The data were taken from two sources. For the period 1941-1970 (see Appendix A), data were taken directly from the National Climatic Data Center at Asheville, N.C. (U.S. Department of Commerce, 1973). Between 1971-1988, data were compiled from monthly climatological data summaries published by the National Oceanic and Atmospheric Administration (see Appendix B). Figures 6 and 7 depict the stations used within each division to obtain the divisional means of monthly

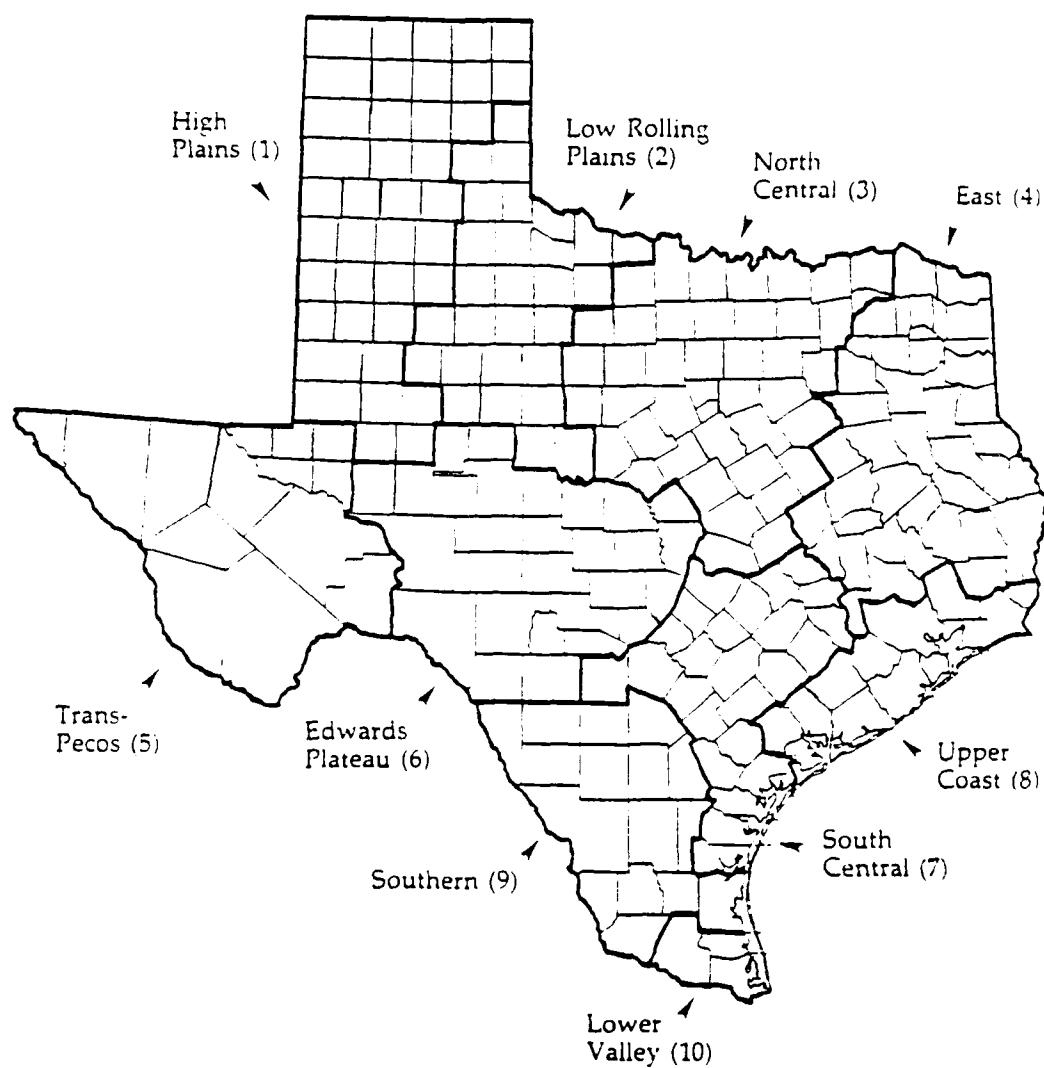


Figure 5. The names and boundaries of the ten climatic divisions of Texas.

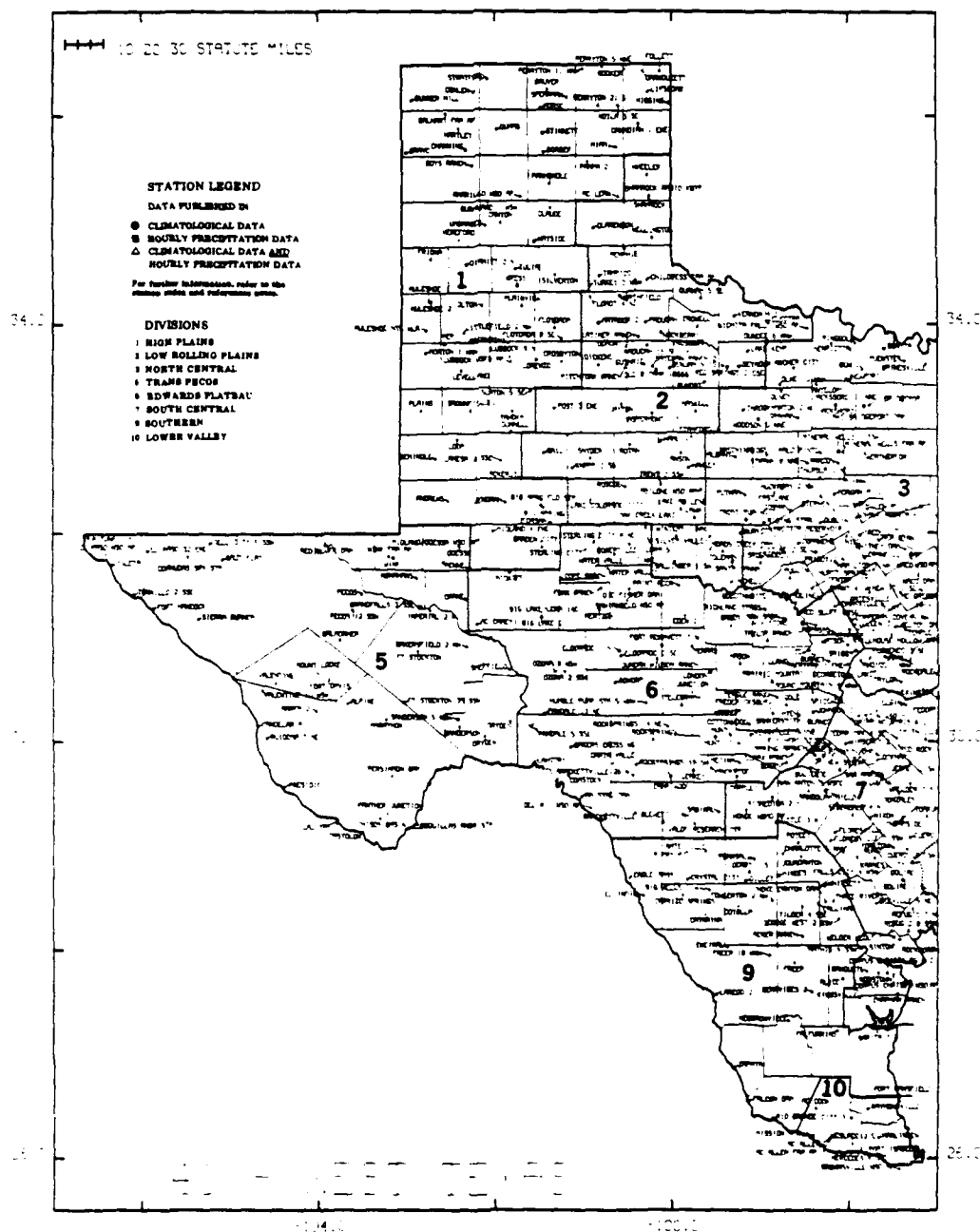


Figure 6. National Weather Service Stations, Cooperative Stations, and Substations for Western Texas during the late 1980s (adapted from the U.S. Department of Commerce, 1989).

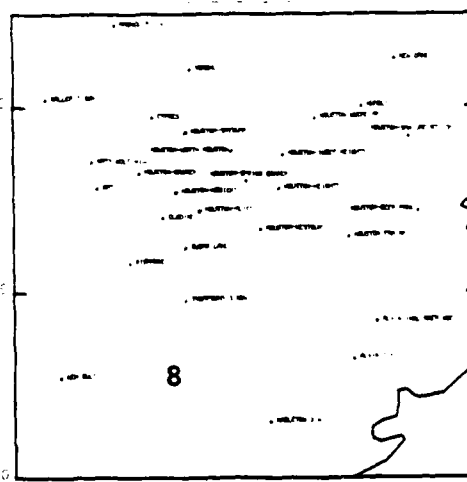
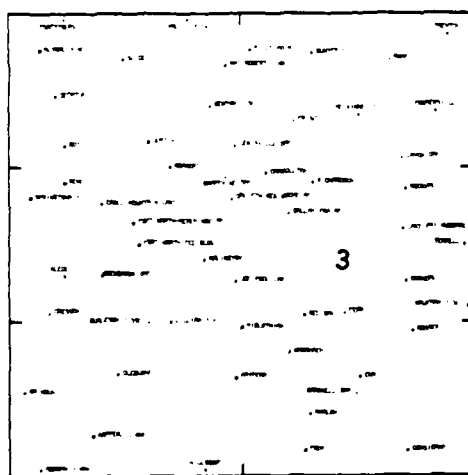
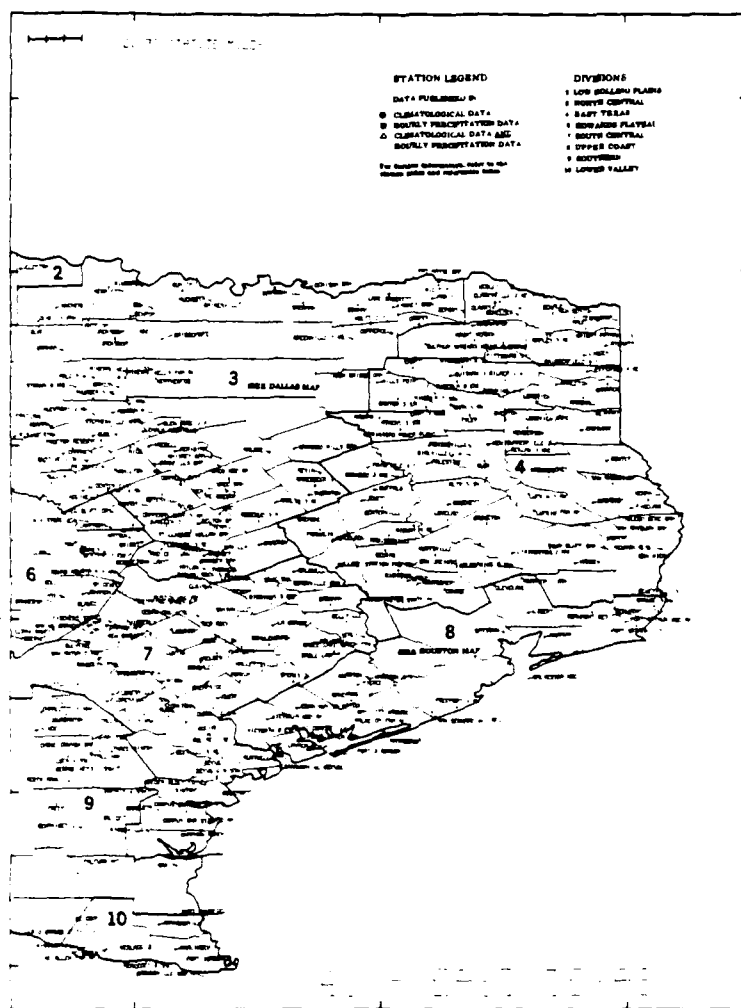


Figure 7. Same as Fig. 6, except for Eastern Texas.

temperature and precipitation. It should be noted these figures show station locations during the late 1980s. Monthly divisional data from earlier in the sample are taken from fewer locations and are therefore probably less reliable than more recent data (see Table 1).

Several recording and non-recording type rain gages have been used since the early 1940s for measuring precipitation. Early in the data sample, the standard 8-inch non-recording gage and the tipping-bucket recording gage were used (Chow, 1964). By the mid-1960s the Belfort (Fischer-Porter) gage instrument with automated readout was phased in. Presently, over 2000 Belfort gages are in operation across the continental U.S. The Universal type gage is the other primary gage in use today. Like the Belfort gage, it has automated readout recorded on paper charts. Even today, the 4-inch or 8-inch non-recording gages are in use at some locations (U.S. Department of Commerce, 1989).

The liquid-in-glass maximum and minimum thermometer has been the primary temperature measuring device used at weather stations and cooperative stations across the U.S. for quite some time. These instruments are mounted about 5 feet above the ground in a white, well-ventilated instrument shelter located at least 100 feet from any paved or concrete surface (Byers, 1974).

CHAPTER III

PROCEDURES AND METHODS OF ANALYSIS

Analysis of mean monthly temperature (MMT) and precipitation (MMP) data for the 48-year period ending in 1988 for each of the ten climatic divisions within the state was performed using the Statistical Analysis System (SAS) computer software. Most graphs presented were accomplished using the Crickett software program on the McIntosh computer system.

A. Development of a Soil Moisture Regime Model

A model to determine a soil moisture budget for each climatic division is developed based on MMP and PET estimates. Figure 8 shows the basic water transports that occur in the Soil-Plant-Atmosphere system. The two major components of this system are precipitation and evapotranspiration.

Linear regression analysis is defined as the amount of change in the dependent variable associated with a unit change in the independent variable (Ott, 1988). The "method of least squares" is the simplest method used to determine the regression line, or "line of best fit" for a sample of data. The product-moment correlation coefficient (R) between two variables measures the strength of the linear relationship between them. A high correlation coefficient (positive or negative) indicates a strong linear relationship whereas a correlation coefficient close to zero indicates little, if any, relationship between two variables. The correlation coefficient does not distinguish between the dependent and independent variables. According to

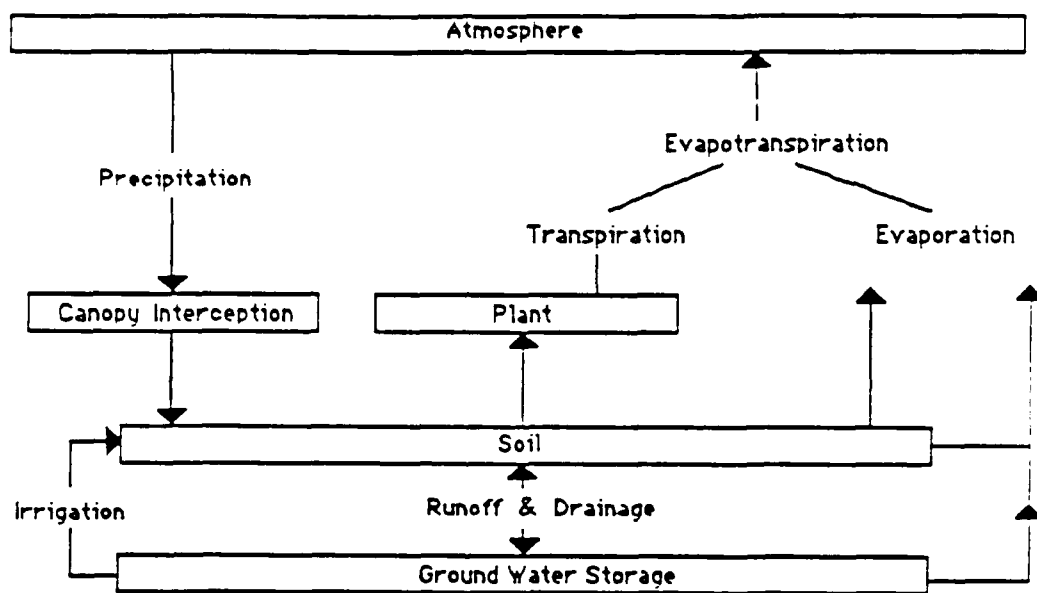


Figure 8. Water transports in the Soil-Plant-Atmosphere system (adapted from Odumodu, 1977).

Panofsky and Brier (1968), "it permits conclusions as to the existence of a linear relationship between two variables, but does not indicate which variable causes the variation of the other". Therefore, one must exercise discretion while using statistics since relationships can be inferred but do not actually prove or necessarily indicate any cause and effect relationship. Coefficient of determination (RSQUARE or R^2) values are used to indicate the proportion of variability in the dependent variable, Y, that can be attributed to the independent variable X.

1. Relationship Between MMP and MMT

Linear regression analysis is performed between MMT and MMP data within each climatic division for all months of the year. The linear regression equation used is:

$$Y = b_0 + b_1X \quad (1)$$

where Y is the estimate of the dependent variable (unknown precipitation), due to a unit variable, X (known temperature);
 b_0 is the predicted value (Y) when $X = 0$ (or the E-intercept);
 b_1 is the slope of the regression line (change in Y for a unit change in X).

Correlation coefficients are computed for each regression line using the following Pearson product-moment correlation coefficient formula:

$$R = \Sigma(x-\bar{x})(y-\bar{y}) / ((\Sigma(x-\bar{x})^2 \Sigma(y-\bar{y})^2))^{1/2} \quad (2)$$

Correlation coefficients are squared to give the RSQUARE values.

F-statistics (or t-statistics since $t^2 = F$) are used to test whether there is a statistically significant linear relationship between MMT and MMP. The resulting b_0 and b_1 values have sampling distributions that are assumed normal with means, or expected values, and standard errors. Results of the statistical test are given in terms of its level of significance (p-value). P-values less than or equal to 0.05 are assumed to indicate statistically significant results.

The slope of the regression line of MMP on MMT and the corresponding RSQUARE value are plotted on maps of Texas for each division during all months of the year. Fields of isopleths of slope and RSQUARE values are plotted to analyze for spatial variations across the state. Slope and standard error of the slope are plotted over the annual cycle to analyze for any temporal trends.

2. Relationship Between Evapotranspiration and Temperature

Monthly evaporation (ME_0) values for each climatic division are estimated using regression techniques outlined in Moe and Griffiths (1965). Moe and Griffiths determined that product-moment correlation coefficients of mean monthly maximum temperature (MMMT) with monthly evaporation from pans were 0.95 or greater for most stations across Texas. Linear regression equations expressing the relationship between MMMT and ME_0 were found to vary across the state. Figures 9 and 10 show fields of isopleths of the slope and E-intercept of the regression line across the state. A specific linear regression equation of the form:

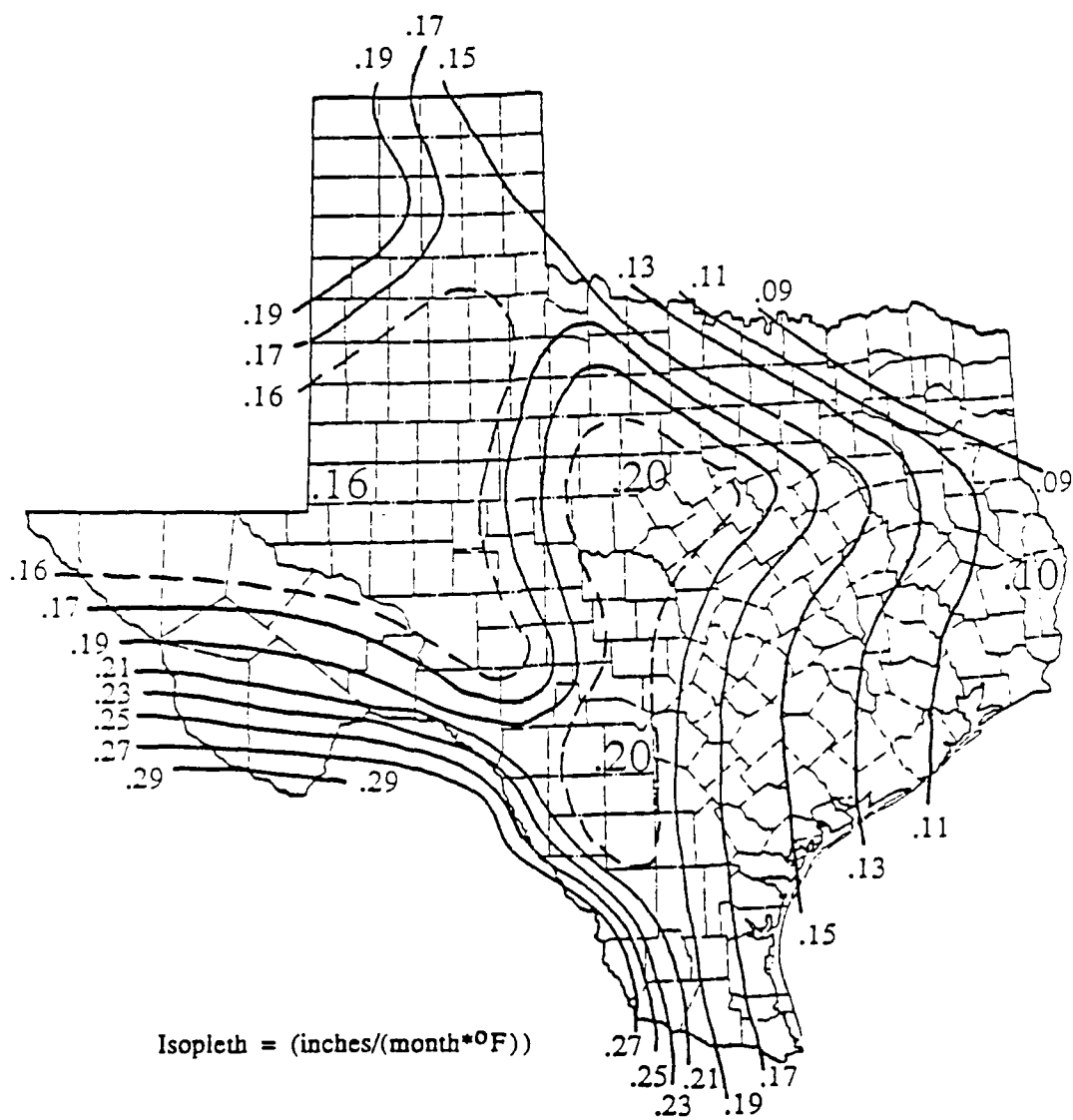


Figure 9. Slope of the regression line of evaporation on maximum temperature (adapted from Moe and Griffiths, 1965).

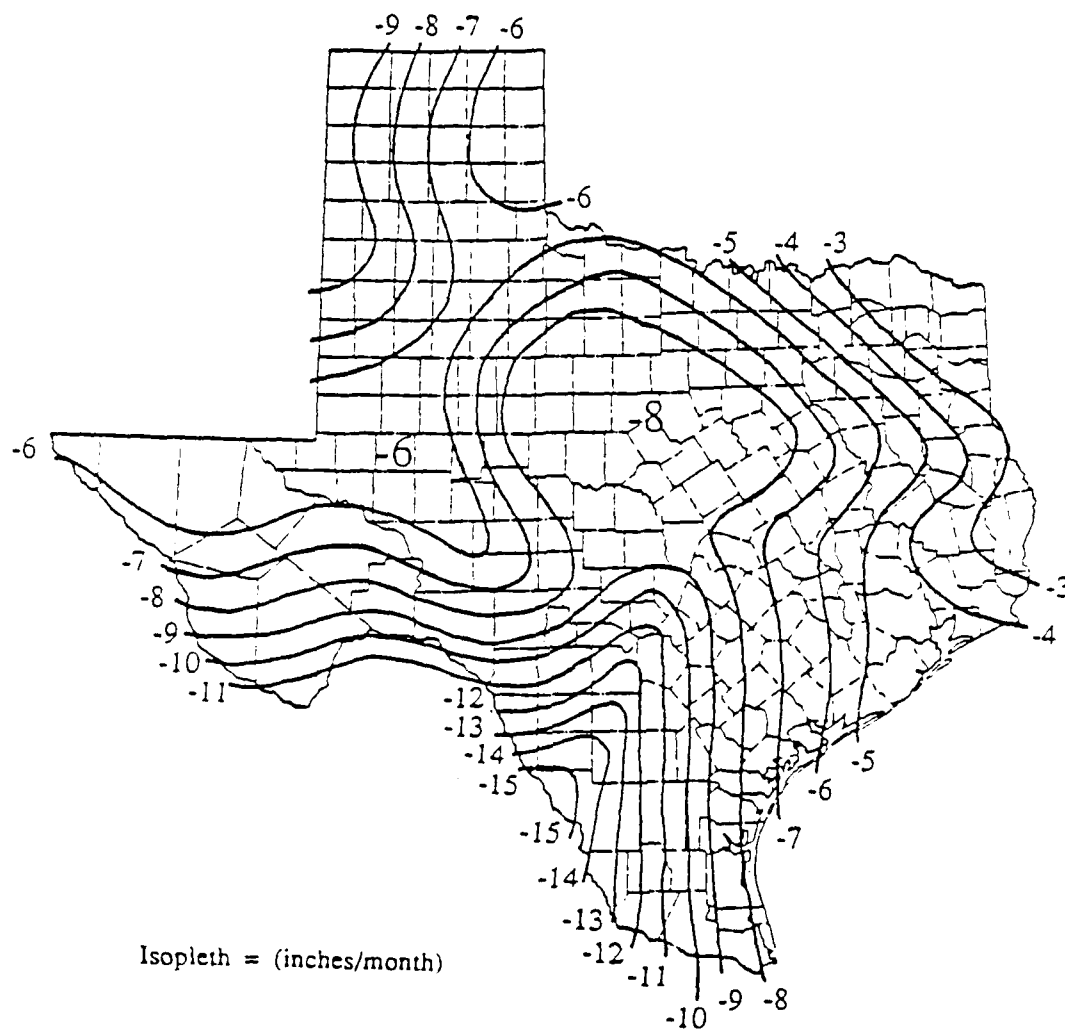


Figure 10. E-intercept of the regression line of evaporation on maximum temperature (adapted from Moe and Griffiths, 1965).

$$ME_0 = (E\text{-Intercept}) + (\text{Slope}) * MMT \quad (3)$$

is estimated for each climatic division within Texas (Table 2). Mean monthly maximum temperature estimates for each division were determined using the following equation:

$$MMMT = MMT + (MTRANGE) * (1/2) \quad (4)$$

Table 2. E_0 regression equation parameter estimates for each climatic division to determine monthly evaporation (ME_0).

Climatic Division	Slope	E-Intercept
High Plains	0.165	- 8.5
Low Rolling Plains	0.165	- 7.5
North Central	0.160	- 7.5
East Texas	0.110	- 4.5
Trans Pecos	0.200	- 8.0
Edwards Plateau	0.175	- 9.5
South Central	0.155	- 8.5
Upper Coast	0.115	- 5.0
Southern	0.200	-13.0
Lower Valley	0.180	-10.0

where MTRANGE is the mean monthly temperature range for a division. MTRANGE values were estimated for each division by plotting fields of isopleths of the mean monthly temperature range across Texas for each month of the year.

Monthly potential evapotranspiration (MPET), the maximum monthly evapotranspiration that would occur from the soil under conditions where soil water supply is unlimited, is estimated using Lowther's (1989) modified

version of the Penman formula. Table 3 shows that the ratio of PET/E_o varies by month according to the seasons. MPET is determined by using the formula:

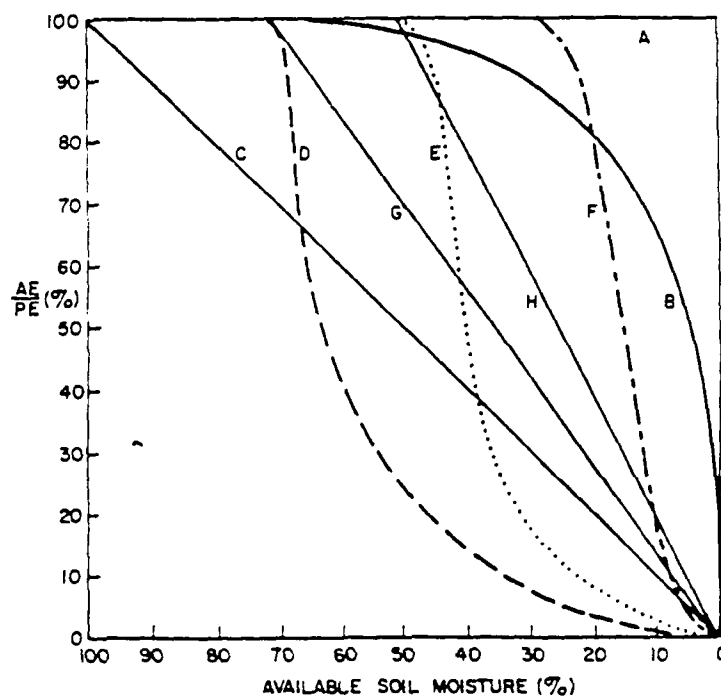
$$MPET = ME_o * PET/E_o \quad (5)$$

where the ratio PET/E_o for a particular month is given in Table 3.

Table 3. Monthly variations of the PET/E_o ratio in Texas (adapted from Lowther, 1989).

<u>Month</u>	<u>PET/E_o</u>
Jan	0.70
Feb	0.70
Mar	0.75
Apr	0.75
May	0.75
Jun	0.80
Jul	0.80
Aug	0.80
Sep	0.75
Oct	0.75
Nov	0.75
Dec	0.70

Figure 11 shows some theorized distributions of AET/PET which may occur within the soil-plant-atmosphere system. Distributions described by Holmes and Robertson (1963) and Thornthwaite and Mather (1955) are generally more accepted by agriculturalists. However, for simplicity, this study assumes evapotranspiration proceeds at a constant high loss rate at all times, as described by Van Bavel (1953) and Veihmeyer (1956). Baier (1969) stated that the application of this method is questionable under dryland conditions. Therefore, results from this research which indicate soil moisture



- Type A. Water is available to plants over the range of field capacity to permanent wilting (Veihmeyer, 1956).
- Type B. No substantial reduction in AE/PE rate except in very dry soils (Pierce, 1958).
- Type C. Linear relationship between available soil moisture and AE/PE rate (Thornthwaite and Mather, 1955).
- Types D, E, F. No reduction in the AE/PE rate over the range of available soil moisture from 100% to 70% (Type D), to 50% (Type E) and to 30% (Type F). Beyond these limits, the AE/PE rate declines exponentially with the drying of soil to 0% soil moisture (Holmes and Robertson, 1963).
- Types G, H. No reduction in the AE/PE rate over the range of available soil moisture from 100% to 70% (Type G) and to 50% (Type H). Beyond these limits, the AE/PE rate decline linearly with the drying of soil to 0% soil moisture.

Figure 11. Relationships of actual to potential evapotranspiration with varying available soil moisture (adapted from Griffiths, 1982).

near or below permanent wilting may be underestimated (may be slightly higher) because evapotranspiration was assumed to continue at the PET rate when it may actually be somewhat less.

3. A Control Soil Moisture Budget

A control, or present day, soil moisture budget for each climatic division is computed based on the 48-year sample means of monthly precipitation and on MPET estimates obtained from equation (5) using the regression formulas from the parameters in Table 2. The soil moisture budget equation used is of the form:

$$\Delta SM = P - \beta E - R_0 - I \quad (6)$$

where ΔSM = time rate of change of mean monthly soil moisture;

P = mean monthly precipitation;

$\beta = \begin{cases} 1 & a_{sm} \geq d \\ (1/d) * a_{sm} & a_{sm} < d \end{cases}$; where a_{sm} is the percent available soil moisture. β is called the evapotranspiration (ET) factor, which assumes ET occurs at the potential rate over the range of field capacity to some value of percent soil moisture (d), below which it decreases linearly to 0% available soil moisture.

E = monthly potential evapotranspiration;

R_0 = runoff;

I = interception of rainfall by vegetative canopies which either evaporates or reaches the ground as stemflow.

Assumptions made in applying this equation to develop a control soil moisture budget for Texas are:

(1) All precipitation is assumed to infiltrate the soil until field capacity is reached. This implies that interception (I) by vegetative canopies and surface runoff (R_0) are negligible. When net precipitation minus evaporation (P-E) exceeds field capacity, R_0 occurs at the maximum rate (100%).

(2) $\beta = 1$. Evapotranspiration is assumed to occur at the potential rate over the range of field capacity to 0% available soil moisture using Van Bavel (1953) and Veihmeyer (1956). Thus, d equals 0% available soil moisture.

(3) Using the advice of Metzger (1989), in this study it is assumed that field capacity is reached when net P-E in the soil is 4 inches or greater (case 1) or when net P-E is 6 inches or greater (case 2). The resulting soil moisture budgets for each division were graphed and analyzed to determine if temporal and spatial patterns appeared reasonable while considering the climatic and synoptic differences across the state.

By applying these assumptions, equation (6) can be rewritten as:

$$\Delta SM = P - E \quad (7)$$

These soil moisture budget equations have good balance and versatility. While the amount of precipitation assumed to enter the soil is maximum, the loss by evapotranspiration is also maximum, thus providing some degree of balance within the equation. Furthermore, parameters β , R_0 , and I in equation (6) can vary according to results from other studies which estimate these parameters more precisely for particular regions, thus providing versatility in the model.

B. A Soil Moisture Budget Based on a Warming Trend

A soil moisture budget for Texas is estimated assuming a rise in temperature across the state. A new soil moisture regime is predicted for each 1°F rise, between 1°F and 4°F, in the mean annual temperature of Texas. The annual rise in mean temperature is assumed to occur either of two ways:

(1) Uniform rise: Mean monthly temperatures increase the same for all months of the year. For example, if the mean annual temperature increases 2°F, then each month experiences a 2°F rise in mean monthly temperature.

(2) Nonuniform rise: Following predictions by GCMs (Kellogg and Zhao, 1988), mean monthly temperature increases are assumed highest during the winter (DJF), lowest during the summer (JJA), with intermediate increases during the transition seasons (MAM, SON). For example, if the mean annual temperature in Texas increases 2°F, then DJF will experience a 3°F rise, MAM and SON a 2°F rise, and JJA a 1°F rise (for a 3°F annual rise, the seasonal distribution would be 4°F in DJF, 3°F in transitional seasons and 2°F in JJA; similar distributions hold true for the 1°F and 4°F annual rise in temperature).

Equation (6) is used to estimate the soil moisture regime that may occur as a result of any rise in temperatures, not only those often attributed to greenhouse warming. Examination of this equation yields the same assumptions used in the control case: All precipitation enters the soil until field capacity is reached; evapotranspiration occurs at the potential rate over the range of field capacity to 0% available soil moisture; runoff and

interception are negligible; and field capacity is reached when soil moisture exceeds either 4 inches (case 1) or 6 inches (case 2).

Mean monthly precipitation and potential evapotranspiration estimates based on a warming trend are determined by using regression equations based on past data and extrapolating results into a future of possible warming. Table 4 shows the equations for the 'lines of best fit' for the regression of mean monthly precipitation on mean monthly temperature. Equations which are highlighted indicate that the regression lines are statistically significant ($p\text{-value} \leq 0.05$). Mean monthly precipitation, or 'P' in equation (6), is estimated for each 1°F rise in mean annual temperature between 1°F and 4°F for both the uniform and non-uniform cases. The statistically significant regression equations (Table 4) are used to determine the change in precipitation associated with a rise in mean monthly temperature, assuming the regression equations hold true in an environment of warmer temperatures. Regression equations which are not statistically significant for a particular month indicate no linear relationship between MMP and MMT. In these months regression equations are not used to predict precipitation changes as mean temperatures increase. Instead, MMP is assumed to remain unchanged as temperatures rise. Monthly evapotranspiration, or 'E' in equation (6), is estimated for each 1°F rise in mean annual temperature between 1°F and 4°F for both the uniform and non-uniform cases. Moe and Griffiths (1965) determined that the relationship between MMT and ME_0 was statistically significant across the state during all months of the year. Therefore, estimates of ME_0 as temperatures increase

MO/ DIV	High Plains	Low Plains	North Central	East Texas	Trans Pecos
Jan	<i>-.05T + 2.5</i>	-.05T + 3.0	-.06T + 4.3	-.03T + 4.7	<i>-.07T + 3.9</i>
Feb	<i>-.05T + 2.8</i>	<i>-.07T + 4.0</i>	-.03T + 3.9	.03T + 2.2	-.03T + 1.9
Mar	-.05T + 3.4	-.03T + 2.5	-.02T + 3.5	.05T + 0.7	<i>-.04T + 2.5</i>
Apr	<i>-.07T + 5.6</i>	-.07T + 6.7	-.15T + 13.2	-.08T + 10.2	-.03T + 2.4
May	-.16T + 13.7	-.20T + 17.8	-.28T + 24.8	-.33T + 28.8	-.08T + 6.6
Jun	<i>-.30T + 25.3</i>	<i>-.37T + 32.3</i>	<i>-.51T + 44.0</i>	<i>-.54T + 46.5</i>	<i>-.21T + 17.9</i>
Jul	<i>-.47T + 39.2</i>	<i>-.46T + 40.6</i>	<i>-.44T + 38.9</i>	<i>-.47T + 41.6</i>	<i>-.35T + 29.8</i>
Aug	<i>-.32T + 27.0</i>	<i>-.41T + 36.4</i>	<i>-.34T + 31.0</i>	<i>-.31T + 28.4</i>	<i>-.25T + 21.9</i>
Sep	<i>-.24T + 19.0</i>	<i>-.37T + 30.4</i>	<i>-.29T + 25.9</i>	-.21T + 19.7	<i>-.35T + 27.6</i>
Oct	-.11T + 8.6	-.14T + 11.6	-.11T + 11.0	.07T + 0.9	-.10T + 8.0
Nov	<i>-.08T + 4.3</i>	<i>-.08T + 5.4</i>	-.00T + 2.4	.06T + 0.7	-.05T + 3.3
Dec	.03T + 1.7	.03T + 0.2	.04T + 0.3	-.06T + 7.1	-.04T + 2.1

MO/ DIV	Edwards Plateau	South Central	Upper Coast	Southern	Low Valley
Jan	-.03T + 2.7	<i>-.12T + 8.1</i>	<i>-.15T + 11.3</i>	<i>-.10T + 6.3</i>	<i>-.12T + 8.5</i>
Feb	-.05T + 4.0	<i>-.10T + 8.1</i>	-.06T + 6.6	<i>-.10T + 6.9</i>	-.07T + 5.9
Mar	<i>-.09T + 6.4</i>	-.10T + 7.9	-.03T + 4.6	-.00T + 1.0	-.05T + 4.1
Apr	<i>-.16T + 12.7</i>	<i>-.27T + 21.4</i>	<i>-.27T + 22.0</i>	<i>-.18T + 14.8</i>	-.09T + 8.5
May	<i>-.37T + 30.2</i>	<i>-.50T + 41.8</i>	-.35T + 31.0	<i>-.35T + 30.9</i>	<i>-.36T + 31.6</i>
Jun	<i>-.41T + 35.6</i>	<i>-.82T + 70.8</i>	<i>-.90T + 77.5</i>	<i>-.54T + 47.8</i>	<i>-.86T + 74.6</i>
Jul	<i>-.59T + 50.1</i>	<i>-.90T + 78.0</i>	<i>-.16T + 134</i>	<i>-.55T + 48.8</i>	<i>-.73T + 63.6</i>
Aug	<i>-.49T + 42.9</i>	<i>-.59T + 52.7</i>	<i>-.90T + 79.5</i>	<i>-.56T + 50.8</i>	<i>-.89T + 78.4</i>
Sep	<i>-.29T + 25.0</i>	<i>-.47T + 41.8</i>	-.27T + 27.0	<i>-.55T + 48.0</i>	<i>-.12T + 98.6</i>
Oct	-.15T + 12.5	-.08T + 9.3	.28T + 15.7	-.16T + 14.4	-.19T + 16.9
Nov	-.05T + 4.3	-.08T + 7.1	-.02T + 5.2	<i>-.14T + 9.7</i>	<i>-.10T + 8.2</i>
Dec	.02T + 0.2	-.05T + 4.8	-.08T + 7.9	-.05T + 3.7	<i>-.10T + 7.0</i>

Table 4: Equations of the regression of mean monthly precipitation on mean monthly temperature. Italicized notation indicates significance at the 95% confidence interval or higher.

should yield significant results. According to Monteith (1973), the conversion of ME_0 to MPET using Penman's method is accurate to within $\pm 15\%$.

The resulting soil moisture budgets for all divisions for each 1°F rise between 1°F and 4°F were graphed and compared with the control soil moisture budget. Four different graphs were plotted and examined for each division based on the following assumptions:

(1) Mean monthly temperatures increase uniformly and field capacity equals 4 inches of net soil water;

(2) Mean monthly temperatures increase non-uniformly and field capacity equals 4 inches of net soil water;

(3) Mean monthly temperatures increase uniformly and field capacity equals 6 inches of net soil water; and

(4) Mean monthly temperatures increase non-uniformly and field capacity equals 6 inches of net soil water.

CHAPTER IV

PRESENTATION OF THE RESULTS

A. Soil Moisture Regime

The results for the soil moisture budget based on present conditions and on an assumed warming trend are presented in this section. Data for all ten climatic divisions will be presented, analyzed, and discussed.

1. Relationship Between MMP and MMT

Table 5 shows the slope, RSQUARE, and the corresponding P-value of the regression line of MMP on MMT for each climatic division during the year. Just over 53% (64 out of 120) of the regression equations were found to be statistically significant ($P \text{ value} \leq 0.05$). The relationship between MMP and MMT was highly significant for the months of June through September, where results indicate that the relationship is significant at the 99% confidence interval in 37 of 40 cases. These high correlations may be the result of the synoptic situation during the summer months. The subtropical high which dominates much of the state during summer gives way to large-scale subsidence over the region. The resulting "subsidence inversion" not only causes temperatures to become warmer but also places a cap on convective activity. Furthermore, the inflow of dry, continental tropical air from the Mexican plateau leads to extremely warm and dry conditions across mainly southwestern portions of the state. The relationship between MMP and MMT becomes less significant and more difficult to explain during spring

MO/ DIV	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
HP	-0.05 0.15 0.007	-0.05 0.22 0.001	-0.05 0.06 0.09	-0.07 0.09 0.04	-0.16 0.05 0.12	-0.30 0.28 0.0001	-0.47 0.45 0.0001	-0.32 0.42 0.0001	-0.24 0.22 0.0009	-0.11 0.03 0.22	-0.08 0.15 0.006	-0.03 0.02 0.35
LP	-0.05 0.06 0.10	-0.07 0.13 0.01	-0.03 0.01 0.41	-0.07 0.03 0.24	-0.20 0.05 0.14	-0.37 0.41 0.0001	-0.46 0.61 0.0001	-0.41 0.58 0.0001	-0.37 0.30 0.0001	-0.14 0.04 0.18	-0.08 0.08 0.05	+0.03 0.01 0.57
NC	-0.06 0.03 0.22	-0.03 0.01 0.45	-0.02 0.00 0.69	-0.15 0.03 0.21	-0.28 0.07 0.05	-0.51 0.34 0.0001	-0.44 0.46 0.0001	-0.34 0.36 0.0001	-0.29 0.17 0.004	-0.11 0.02 0.38	-0.00 0.00 0.98	+0.04 0.03 0.24
ET	-0.03 0.00 0.65	+0.03 0.01 0.61	+0.05 0.01 0.47	-0.08 0.01 0.52	-0.33 0.06 0.08	-0.54 0.15 0.007	-0.47 0.28 0.0001	-0.31 0.15 0.006	-0.21 0.06 0.09	+0.07 0.00 0.66	+0.06 0.01 0.58	-0.06 0.01 0.45
TP	-0.07 0.18 0.003	-0.03 0.00 0.90	-0.04 0.02 0.30	-0.03 0.02 0.36	-0.08 0.03 0.23	-0.21 0.19 0.002	-0.35 0.52 0.0001	-0.25 0.29 0.0001	-0.35 0.20 0.002	-0.10 0.05 0.12	-0.05 0.07 0.07	-0.04 0.03 0.24
EP	-0.03 0.02 0.39	-0.05 0.04 0.18	-0.09 0.10 0.03	-0.16 0.08 0.05	-0.37 0.18 0.003	-0.41 0.25 0.0003	-0.59 0.58 0.0001	-0.49 0.39 0.0001	-0.29 0.14 0.008	-0.15 0.04 0.17	-0.05 0.03 0.24	+0.02 0.00 0.65
SC	-0.12 0.11 0.02	-0.10 0.09 0.03	-0.10 0.07 0.07	-0.27 0.10 0.03	-0.50 0.18 0.003	-0.82 0.24 0.0004	-0.90 0.49 0.0001	-0.59 0.27 0.0002	-0.47 0.14 0.008	-0.08 0.01 0.57	-0.08 0.02 0.30	-0.05 0.02 0.41
UC	-0.15 0.12 0.02	-0.06 0.02 0.38	-0.03 0.00 0.73	-0.27 0.08 0.05	-0.35 0.04 0.17	-0.90 0.10 0.03	-1.56 0.35 0.0001	-0.90 0.21 0.001	-0.27 0.02 0.32	+0.28 0.04 0.18	-0.02 0.00 0.84	-0.08 0.02 0.34
S	-0.10 0.16 0.005	-0.10 0.14 0.009	-0.00 0.00 0.94	-0.18 0.10 0.03	-0.35 0.17 0.004	-0.54 0.29 0.0001	-0.55 0.49 0.0001	-0.56 0.33 0.0001	-0.55 0.24 0.0004	-0.16 0.06 0.10	-0.14 0.19 0.002	-0.05 0.03 0.21
LV	-0.12 0.13 0.01	-0.07 0.05 0.13	-0.05 0.04 0.20	-0.09 0.02 0.33	-0.36 0.11 0.02	-0.86 0.33 0.0001	-0.73 0.42 0.0001	-0.89 0.27 0.0002	-1.15 0.36 0.0001	-0.19 0.05 0.13	-0.10 0.09 0.04	-0.10 0.11 0.02

Table 5. Slope (top), RSQUARE (middle), and the corresponding P-value (bottom) of the regression line of precipitation on mean temperature for each climatic division during the year.

and fall. Correlations are significant in half of the divisions in April and May and less than half in March, October, and November. The relationship between MMP and MMT may be less significant in these months because of the higher frequency of frontal activity resulting from the southern migration of the polar jet stream and subtropical high. Precipitation is maximum in most of Texas during late spring with a secondary maximum occurring during autumn due to the high frequency of cold fronts which affect the state. As frontal activity increases, long periods of time with large-scale subsidence across much of the state is diminished. It is interesting to note that during April and May most of the significant correlations are present in the southern half of the state, perhaps because fewer fronts penetrate the southern half of the state than the northern half (subtropical high is a more dominating factor in the southern portions of the state). Between October and March, 16 of 60 cases were found to have a statistically significant relationship between MMP and MMT. In 13 of these 16 cases, the significant relationship occurred in divisions which average less than 1.50 inches of precipitation in these particular months. This seems to suggest that the relationship between MMP and MMT in these months holds best in dry regions of the state. Figure 12 shows the number of months within each division for which a statistically significant relationship between MMP and MMT exists. Also depicted is the mean annual precipitation and percentage of mean annual precipitation within each division that is accounted for by a statistically significant relationship. In general, although precipitation increases west to east across the state, the number of months with significant

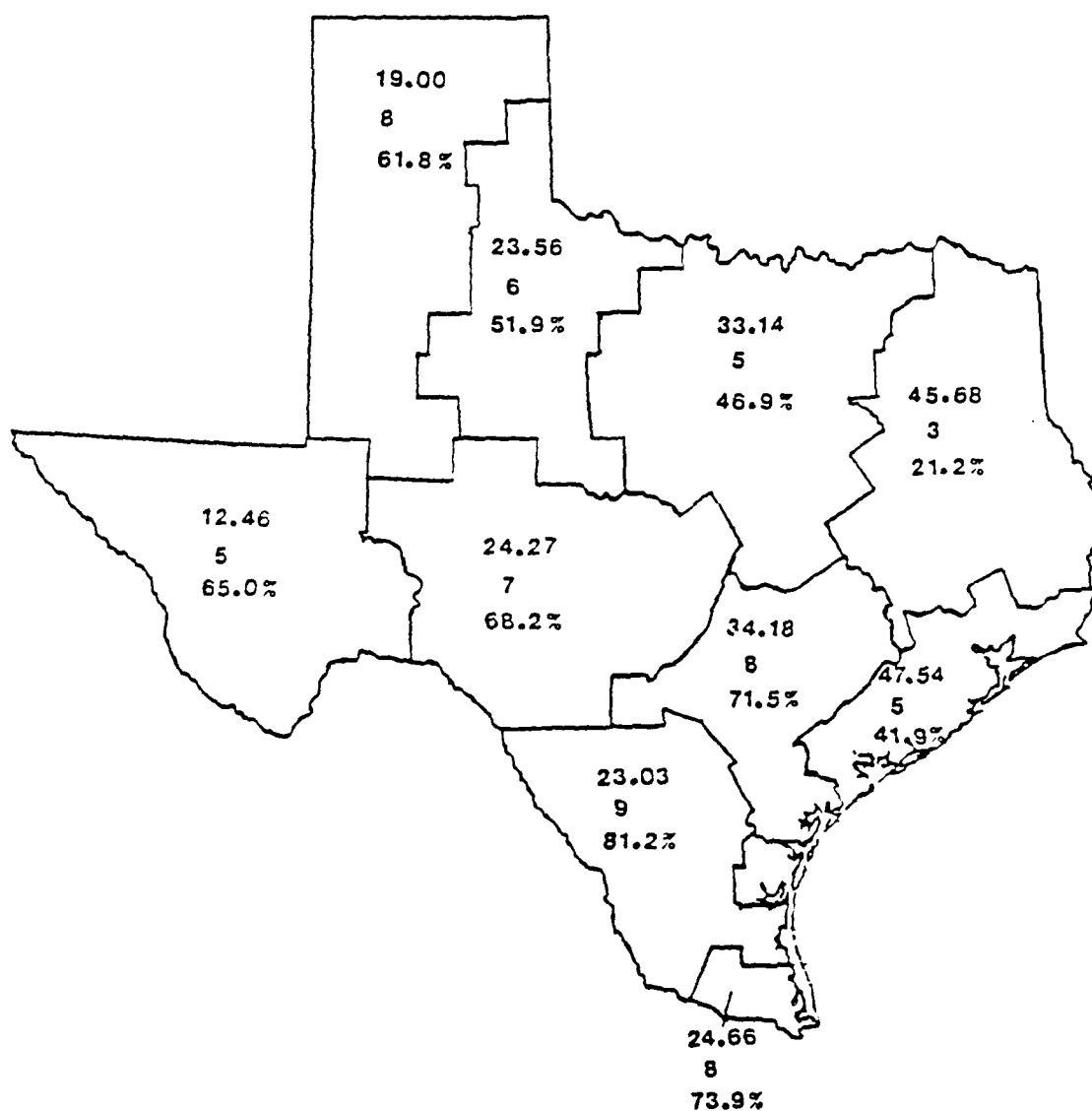


Figure 12. Mean annual precipitation (top); number of months with a statistically significant relationship between MMP and MMT (middle); and percentage of mean annual precipitation accounted for by a statistically significant relationship between MMP and MMT (bottom) for each climatic division in Texas.

correlations between MMP and MMT decreases. Similarly, the percentage of mean annual rainfall explained by a statistically significant relationship between MMP and MMT is highest in the western and southern regions of the state and decreases toward the northeast. Less than 50% of the mean annual rainfall which falls in the North Central, East, and Upper Coast Divisions is associated with a significant correlation with temperature. About 44% of Texas' mean annual precipitation occurs in these divisions.

The slope and corresponding RSQUARE values of the regression line of MMP on MMT were found to vary across the state and through the annual cycle. Figures 13 through 24 show the fields of isopleths of the slope of the regression line of MMP on MMT with corresponding fields of RSQUARE values. In general, between January and March (Figs. 13-15) slopes indicate a gradual decline in precipitation through most of the state as temperatures increase. In January (Fig. 13) slopes are most negative in the southeast and become less negative toward the northwest. RSQUARE values indicate significant results are limited to the western and southern portions of the state. The patterns for slope differ significantly between January and March. Slopes are positive in East Texas during February (Fig. 14) and become negative towards the southwest. In March (Fig. 15), negative slopes are centered in the southwest and become less negative toward the west and east. However, RSQUARE values indicate only a few divisions have a statistically significant relationship between MMP and MMT during February and March. A much clearer pattern of the slope is evident in April (Fig. 16). Negative slopes are centered over southeastern regions of the state and become less

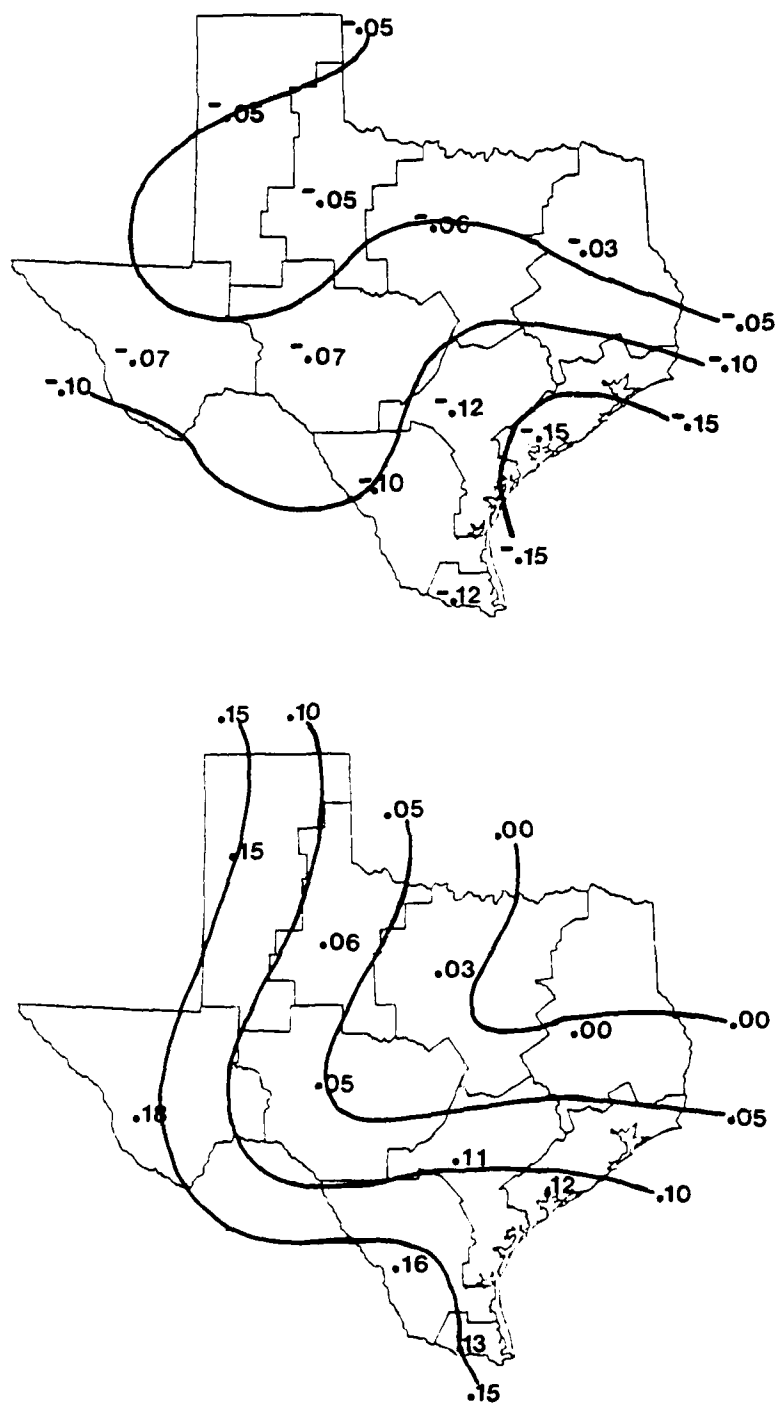


Figure 13. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for JANUARY. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

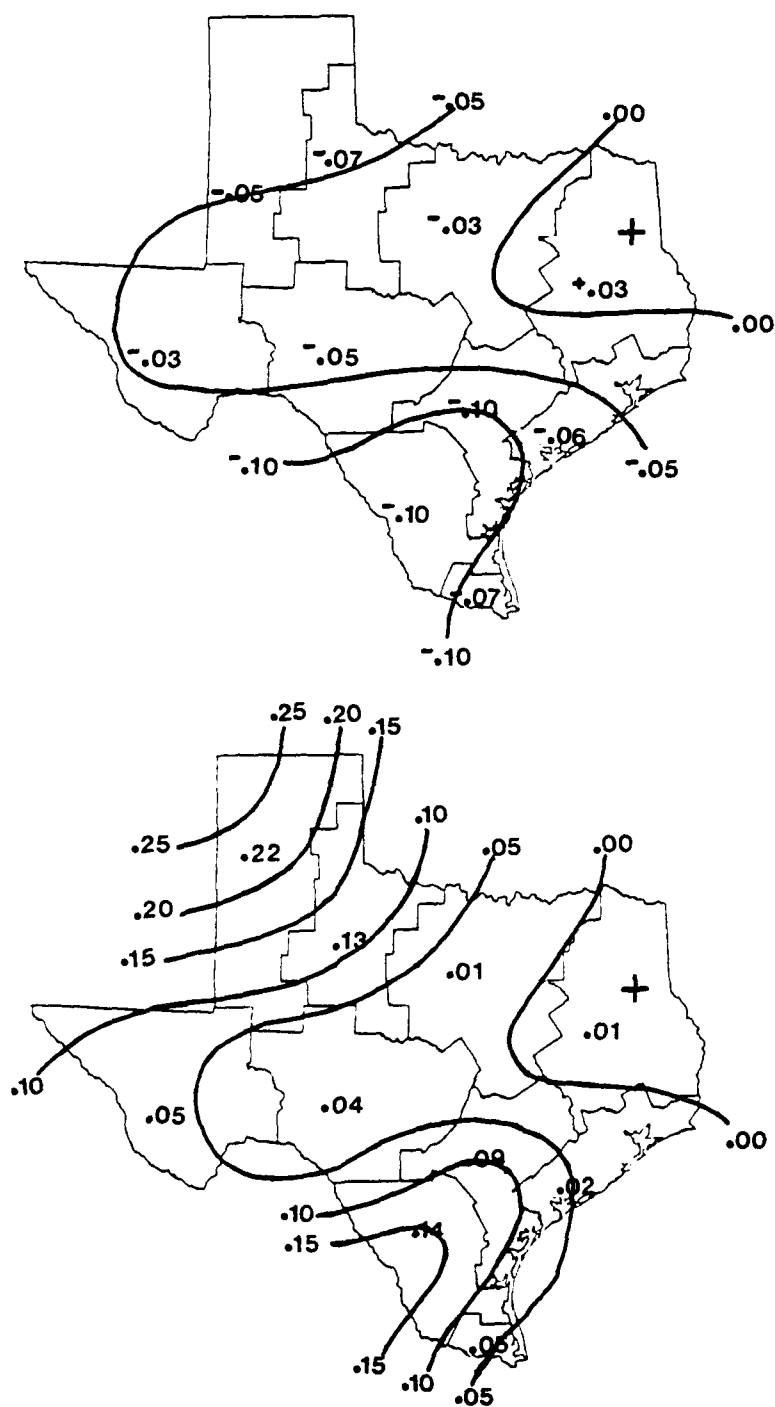


Figure 14. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for FEBRUARY. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

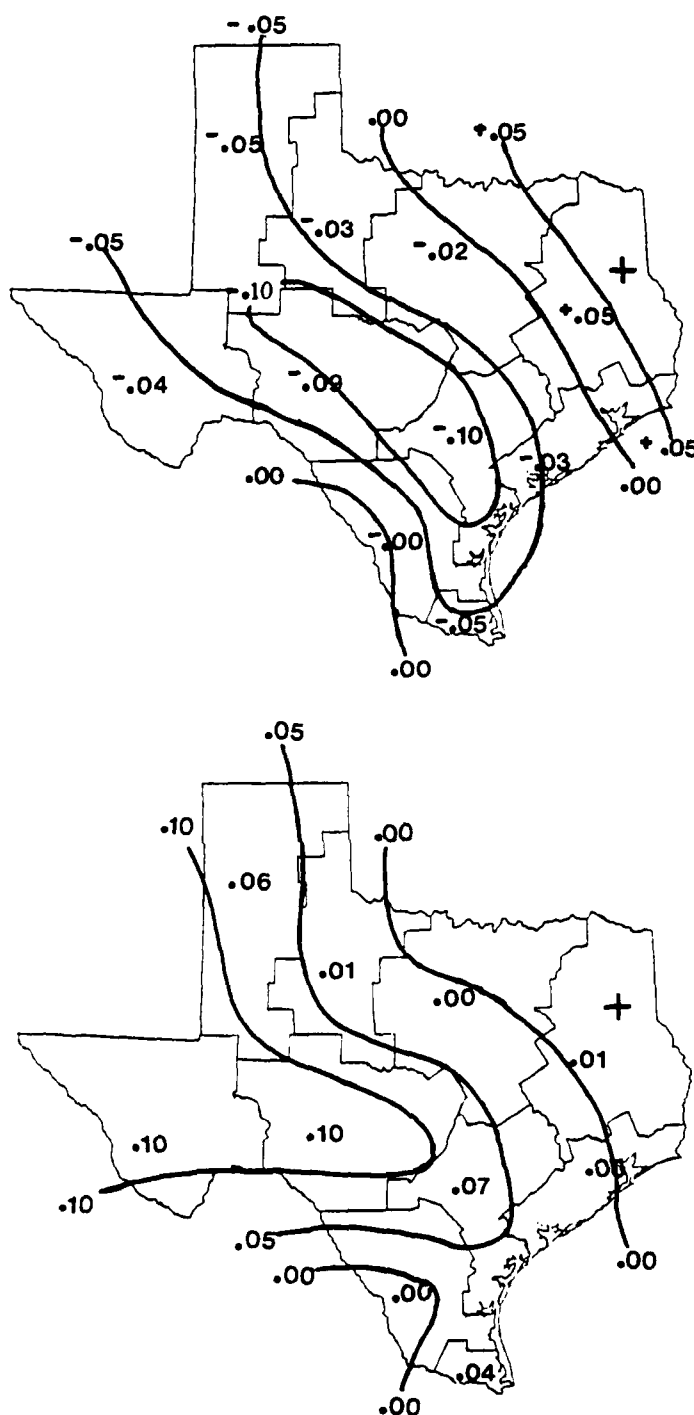


Figure 15. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for MARCH. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

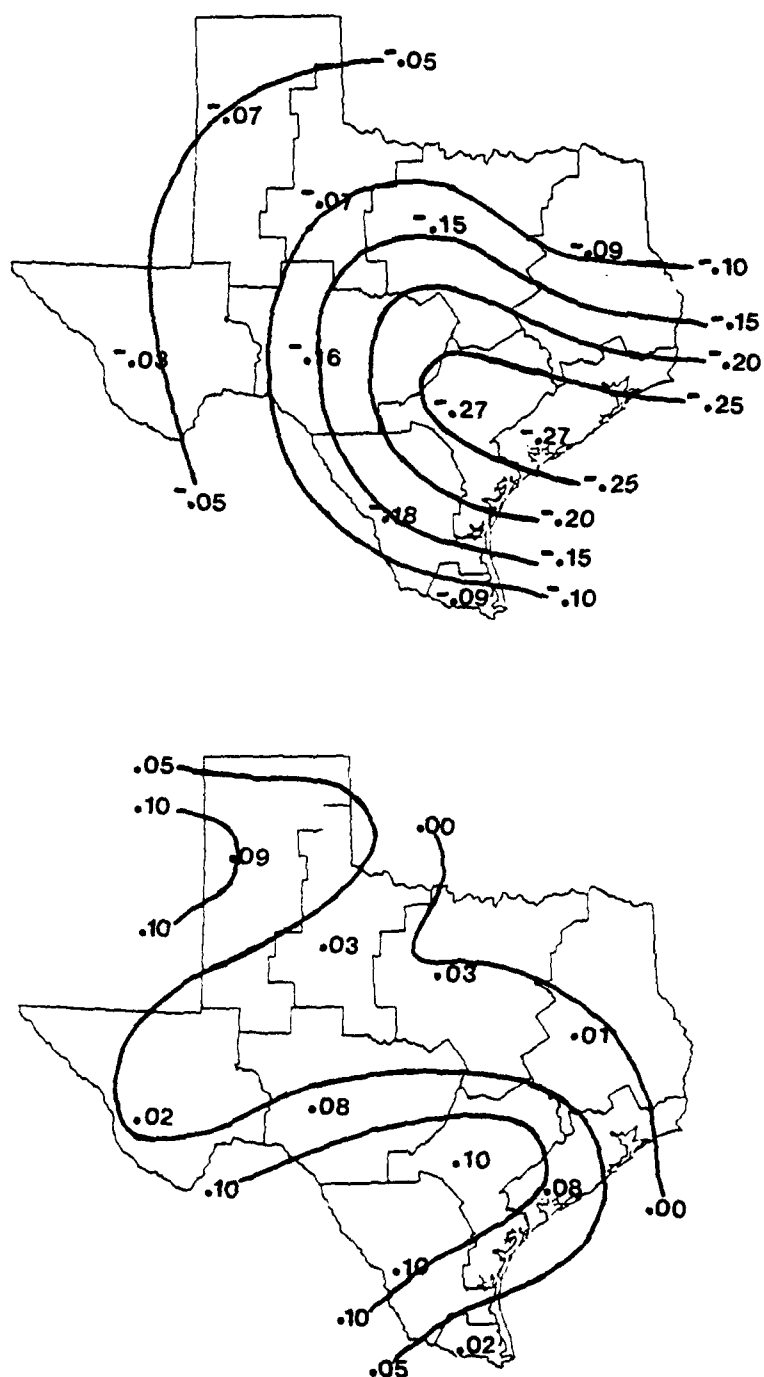


Figure 16. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for APRIL. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

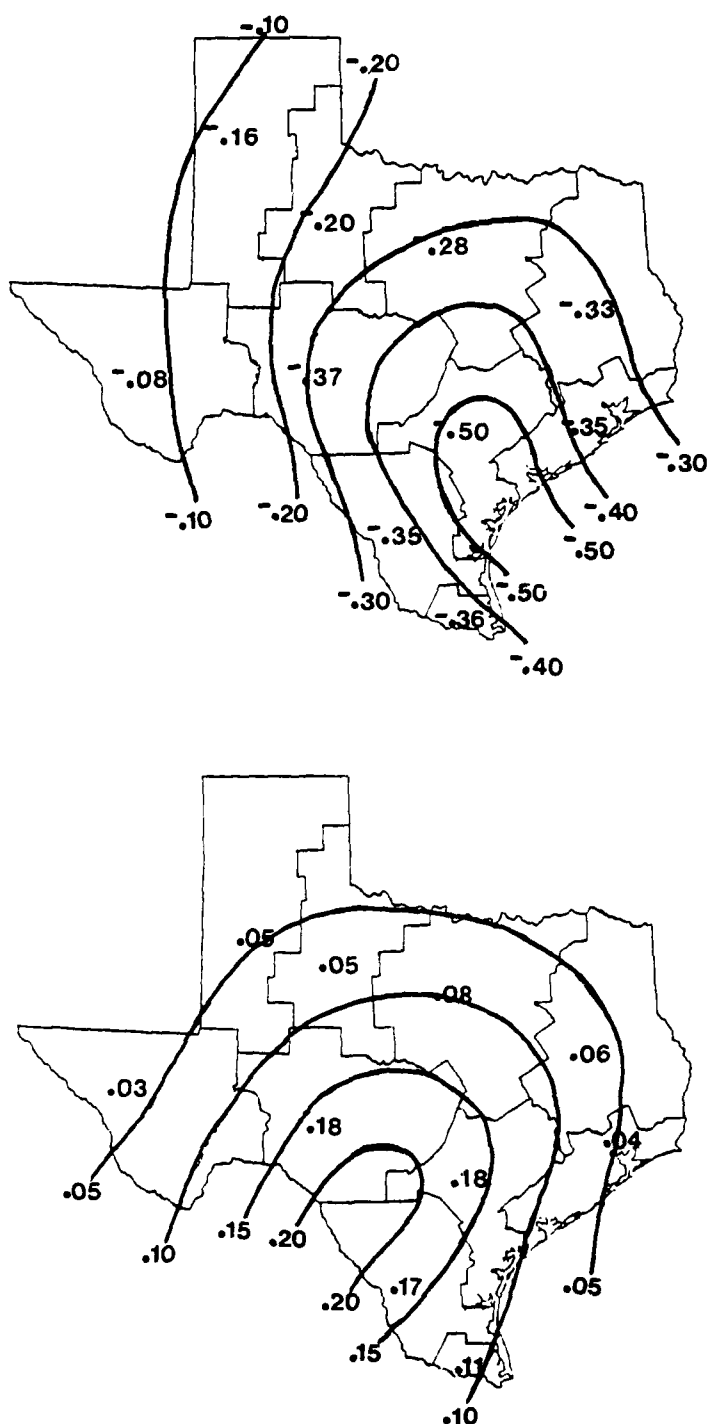


Figure 17. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for MAY. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

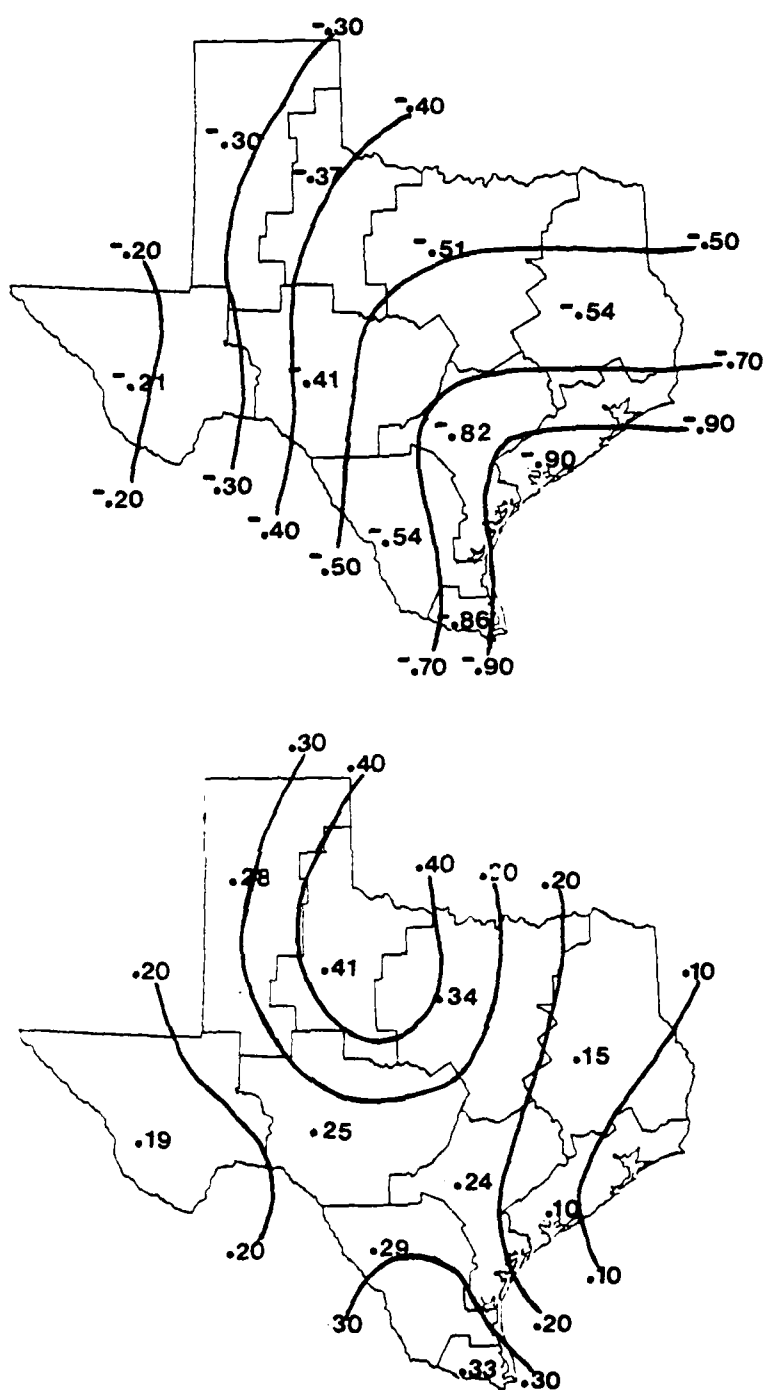


Figure 18. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for JUNE. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

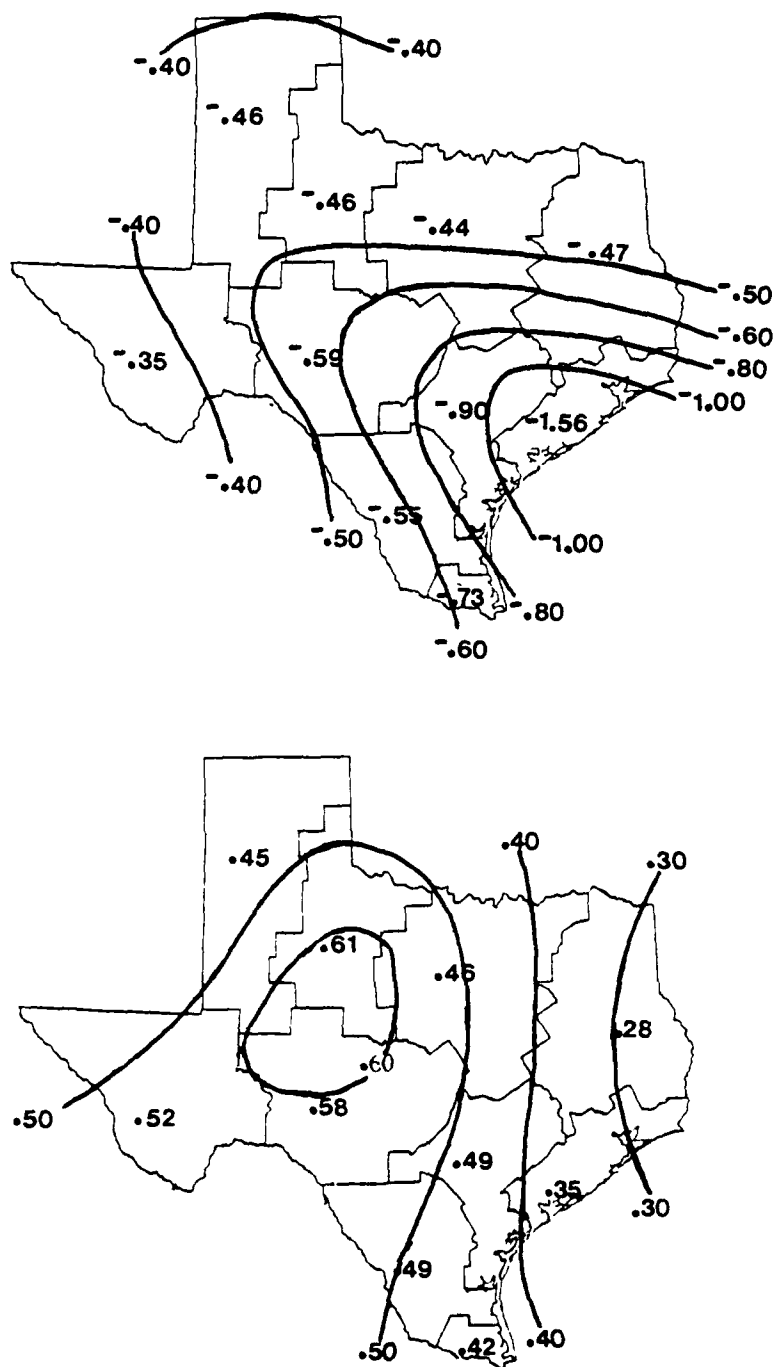


Figure 19. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for JULY. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

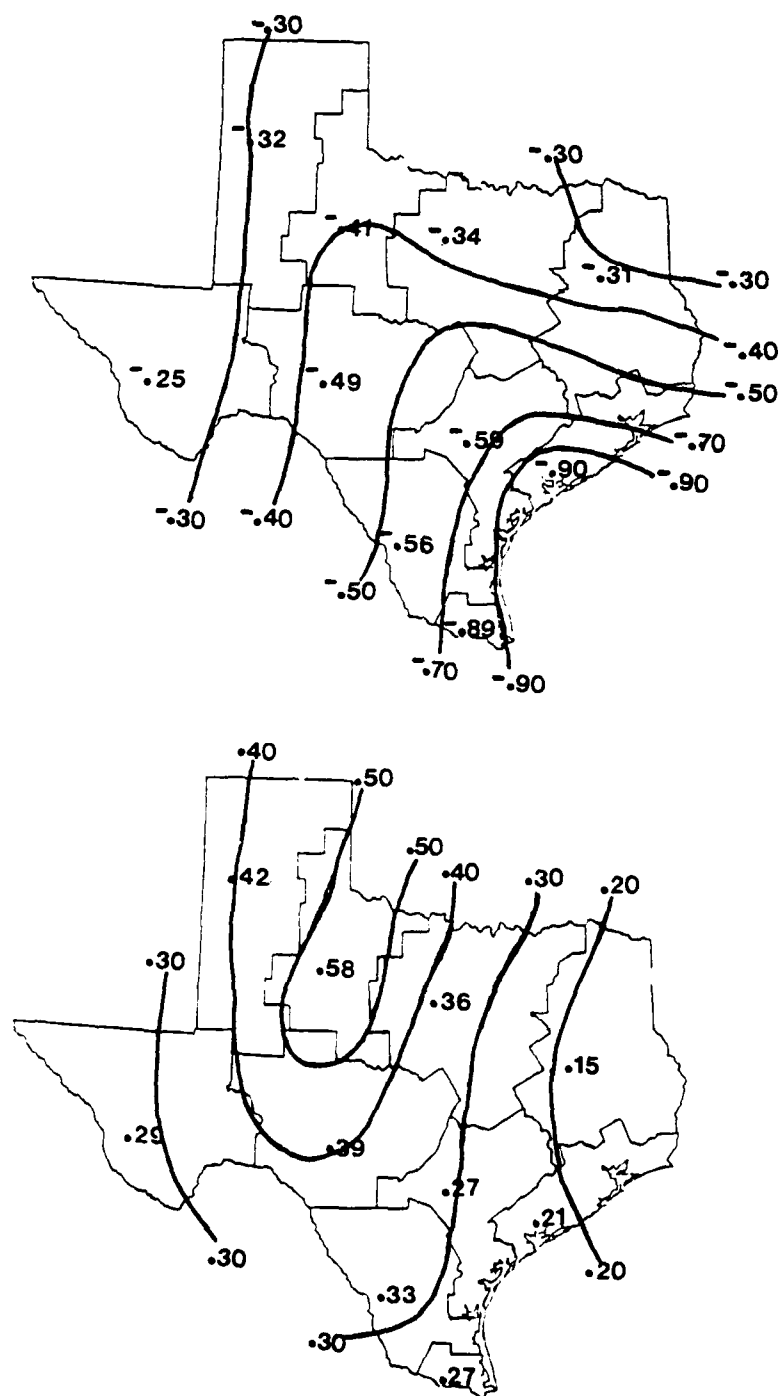


Figure 20. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for AUGUST. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

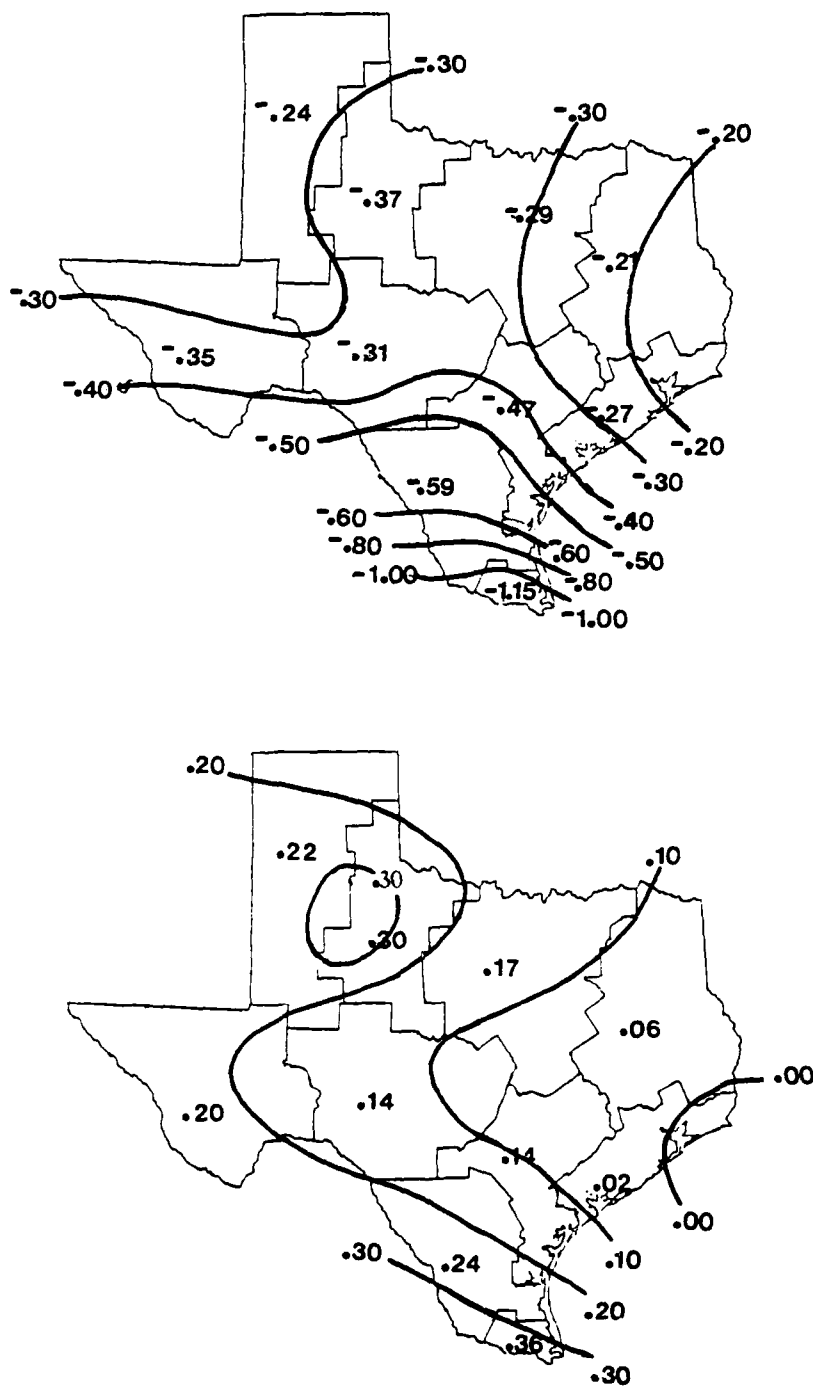


Figure 21. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for SEPTEMBER. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

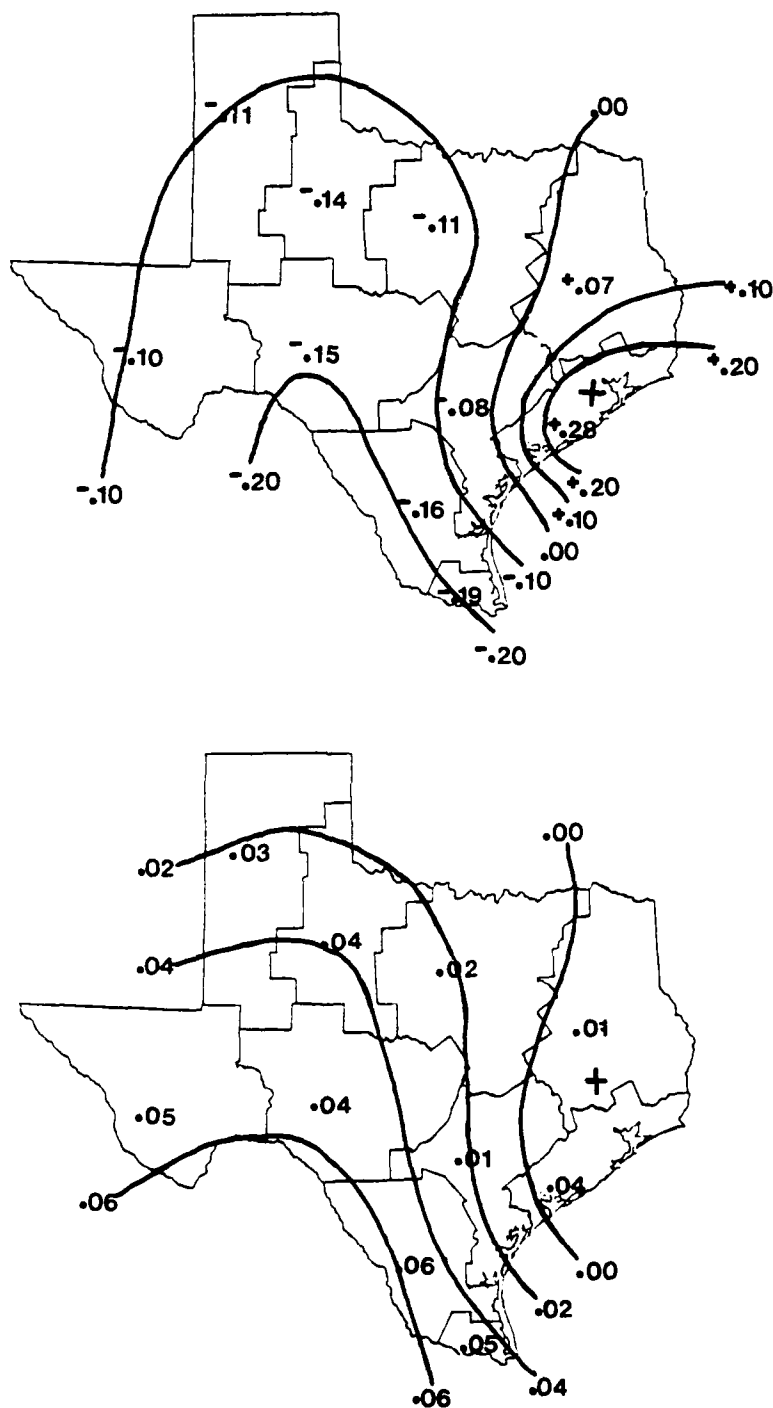


Figure 22. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for OCTOBER. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

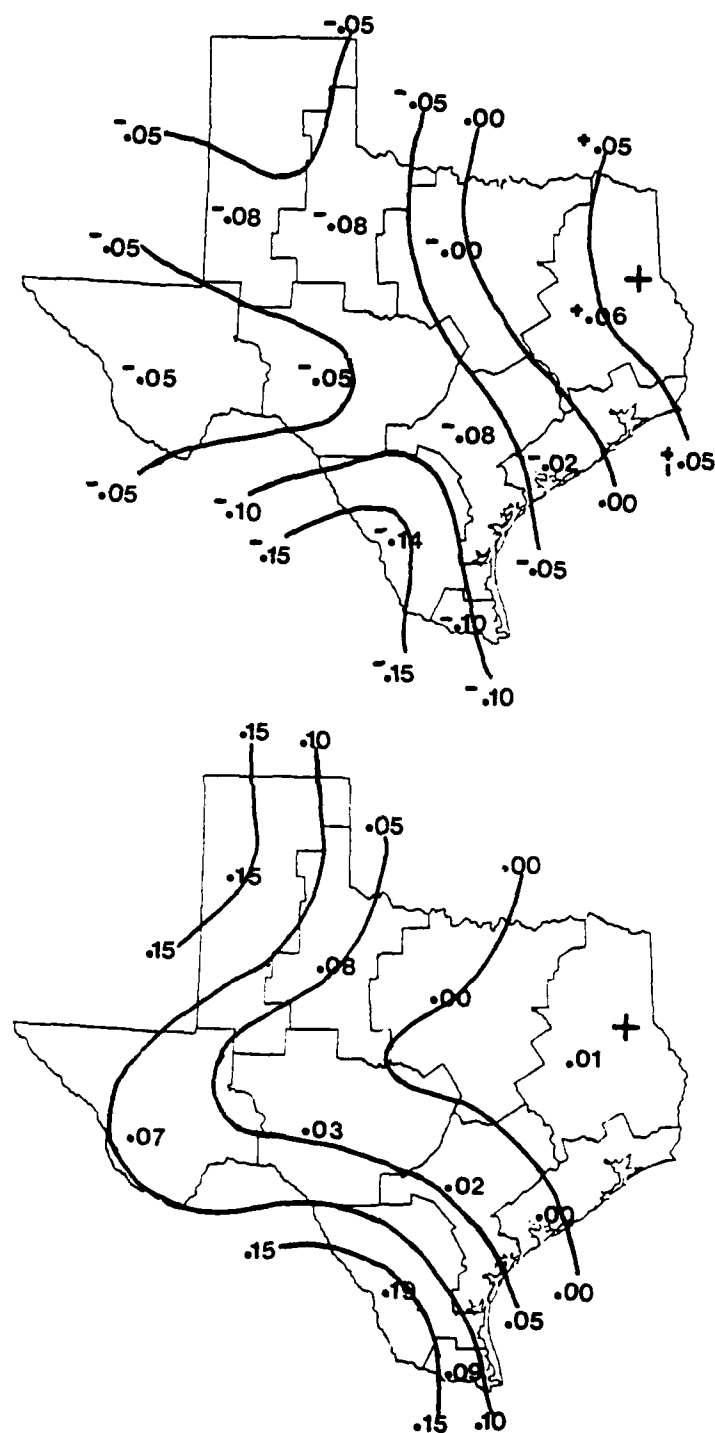


Figure 23. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for NOVEMBER. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

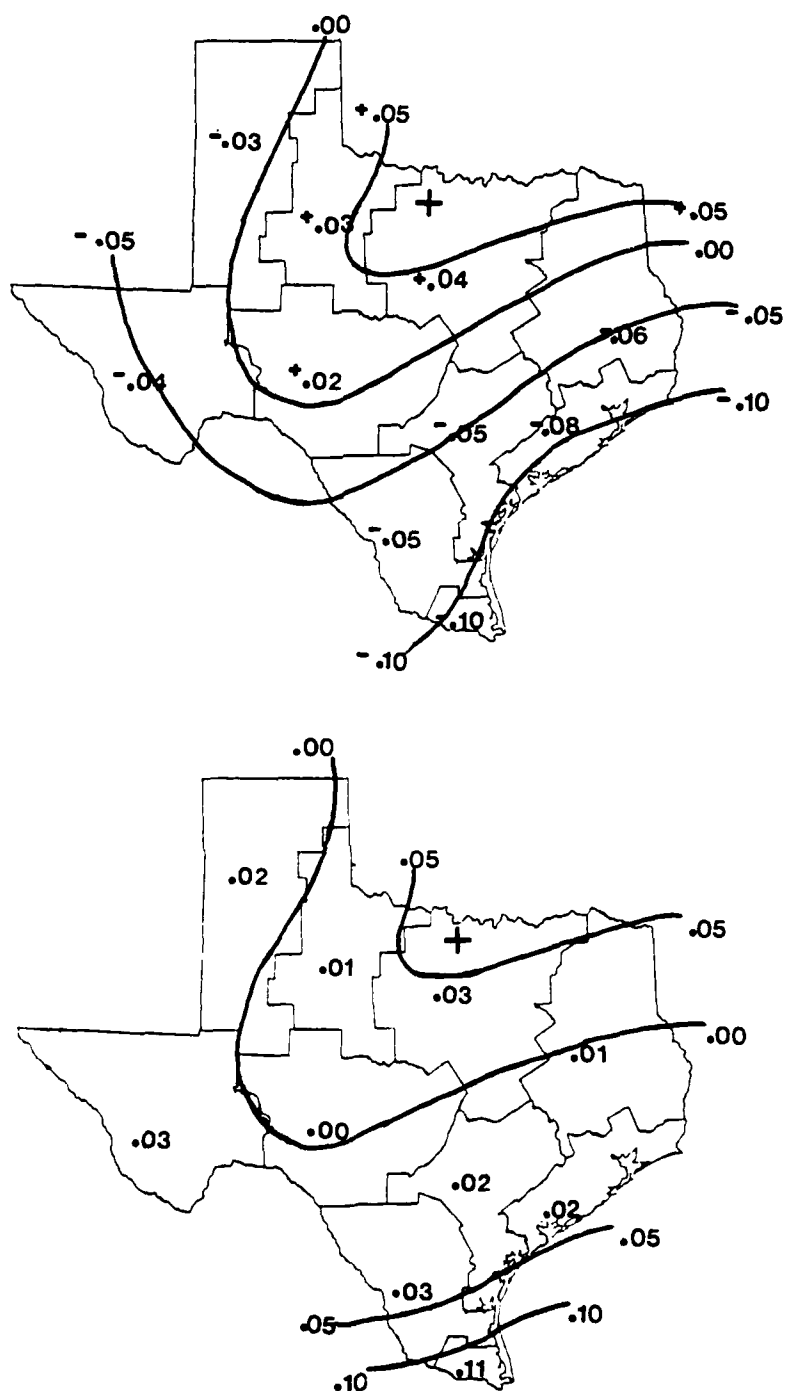


Figure 24. Slope of the regression line of precipitation on mean temperature (top) with corresponding RSQUARE values (bottom) for DECEMBER. RSQUARE values greater than or equal to 0.08 and 0.13 are significant at the 95% and 99% confidence interval, respectively.

negative toward the west and northwest. The pattern is similar between May and August (Figs. 17-20). However, the magnitudes of negative slopes become much larger between April and July. Figure 19 shows that precipitation may decline over 1.50 inches during July in the southeast for every 1°F rise in mean temperature, whereas the same region loses only 0.25 inches during April (Fig. 16). RSQUARE values indicate increasing reliability in the results from spring to late summer. During September (Fig. 21), the greatest decline in precipitation (if temperatures increase) occurs in the Lower Valley. Slopes become less negative toward the north. RSQUARE values are significant in all divisions except East Texas and the Upper Coast. The patterns of slope shifts each month between October and December (Figs. 22-24). During October (Fig. 22), the most negative slopes are found in the extreme south and southwestern regions of the state while positive slopes are evident over southeastern Texas. In November and December (Figs. 23 and 24) gradual changes in precipitation are found state-wide. However, statistically significant results are limited to only a few divisions during these months, thus little faith can be placed in slope values derived from the regression of MMP on MMT.

Figures 25-34 illustrate the annual distribution of the slope and standard error of the slope of the regression line of MMP on MMT for each climatic division. The same *general* pattern is evident for all divisions throughout the year. Slopes are near zero during winter and decrease (become more negative) during spring. As summer approaches, slopes decrease sharply and become most negative in June or July. By autumn, slopes increase and approach zero by late fall or winter. In some divisions,

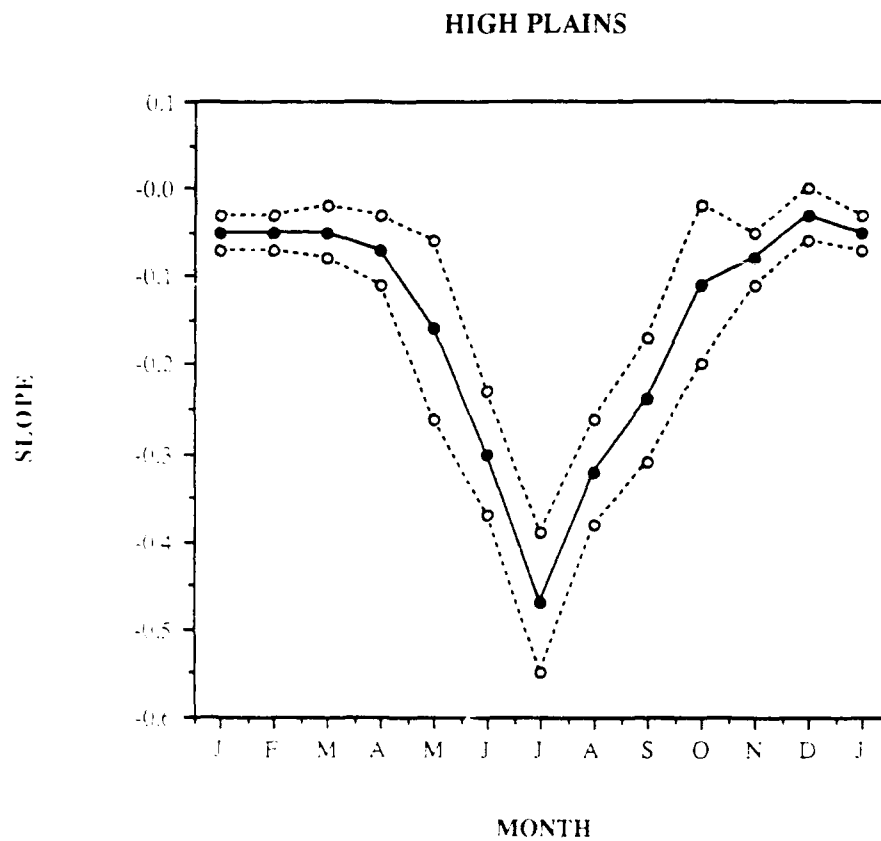


Figure 25. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the High Plains.

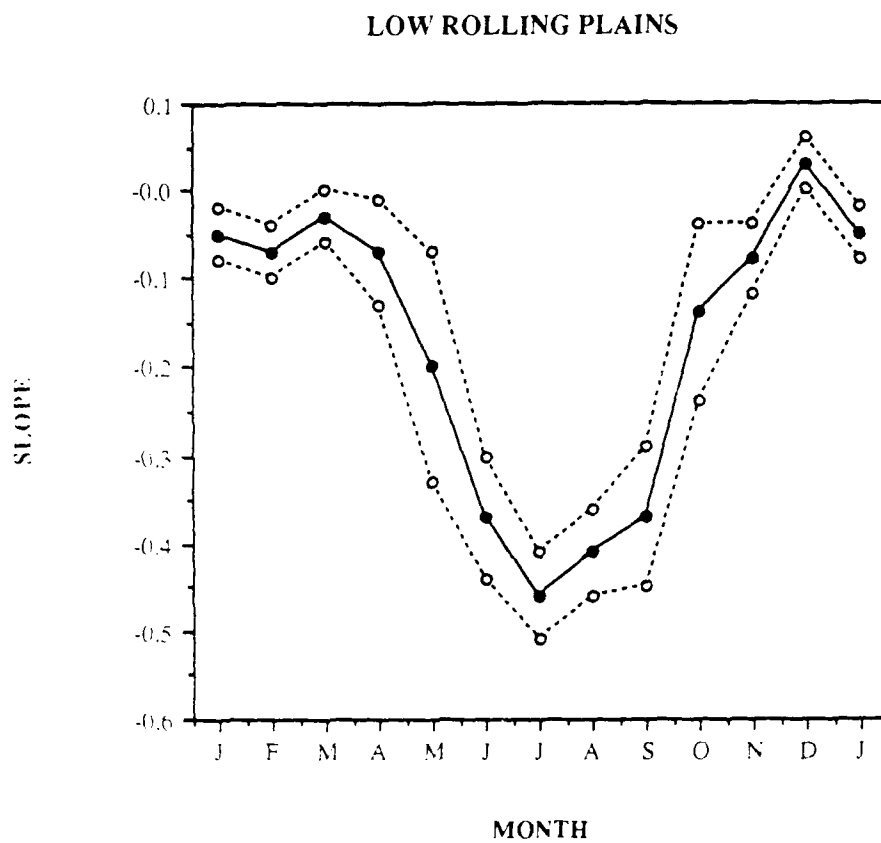


Figure 26. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the Low Rolling Plains.

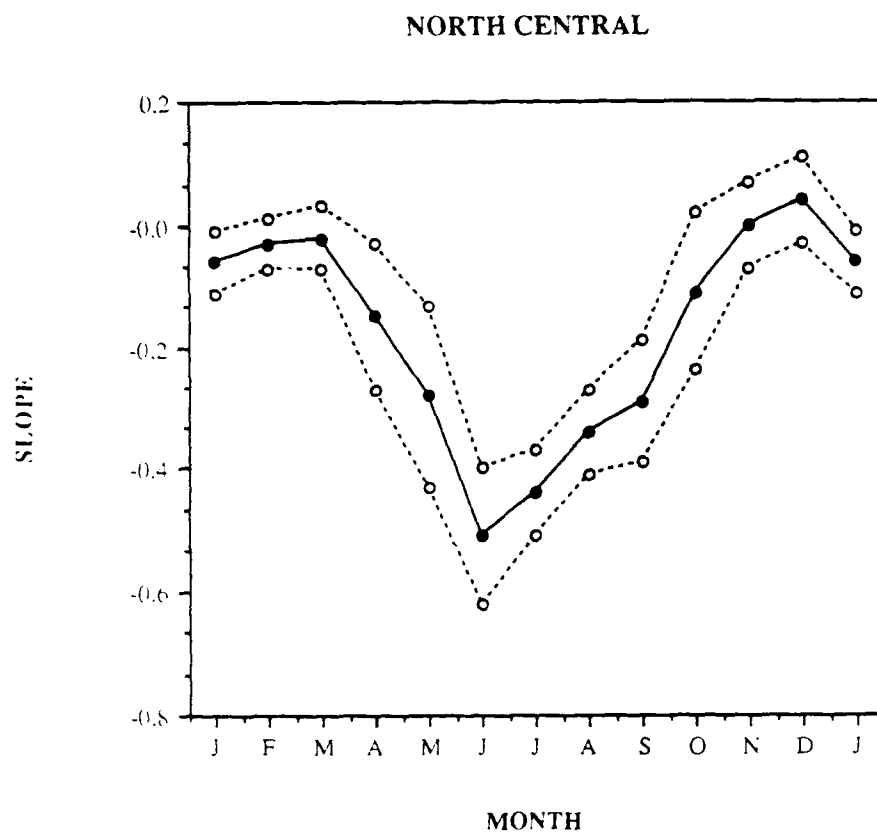


Figure 27. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for North Central Texas.

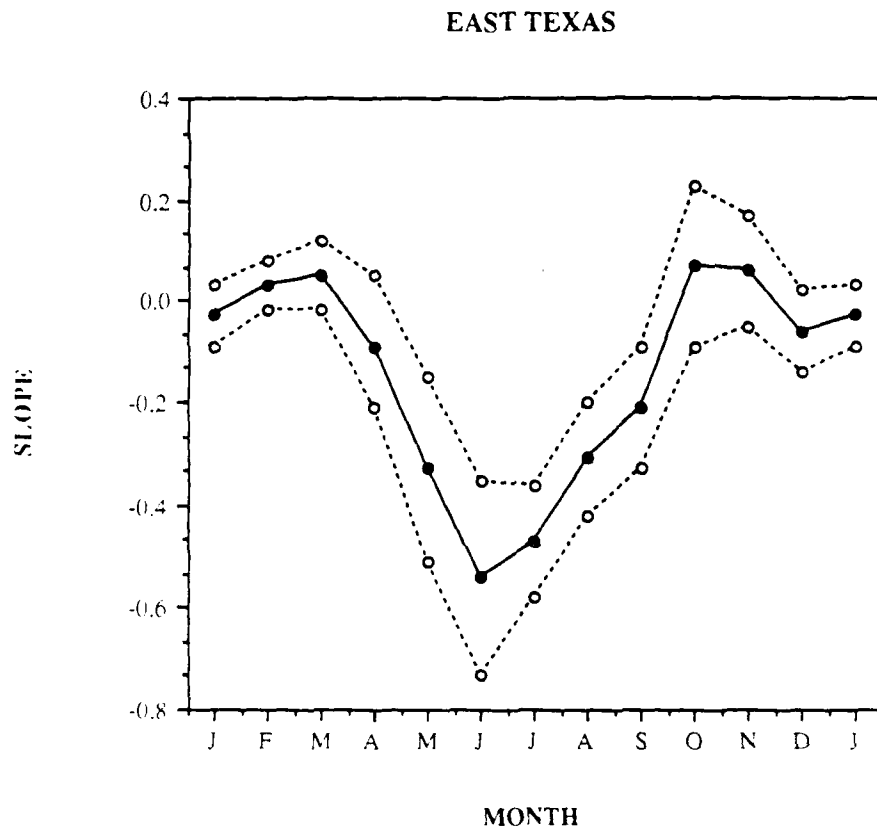


Figure 28. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for East Texas.

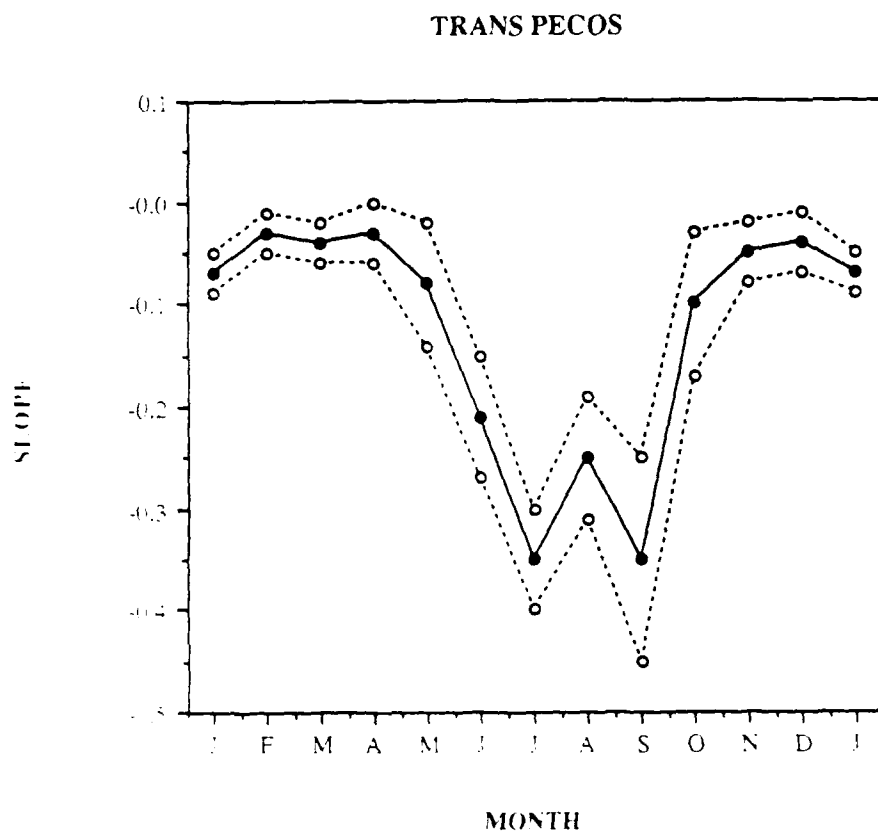


Figure 29. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the Trans Pecos.

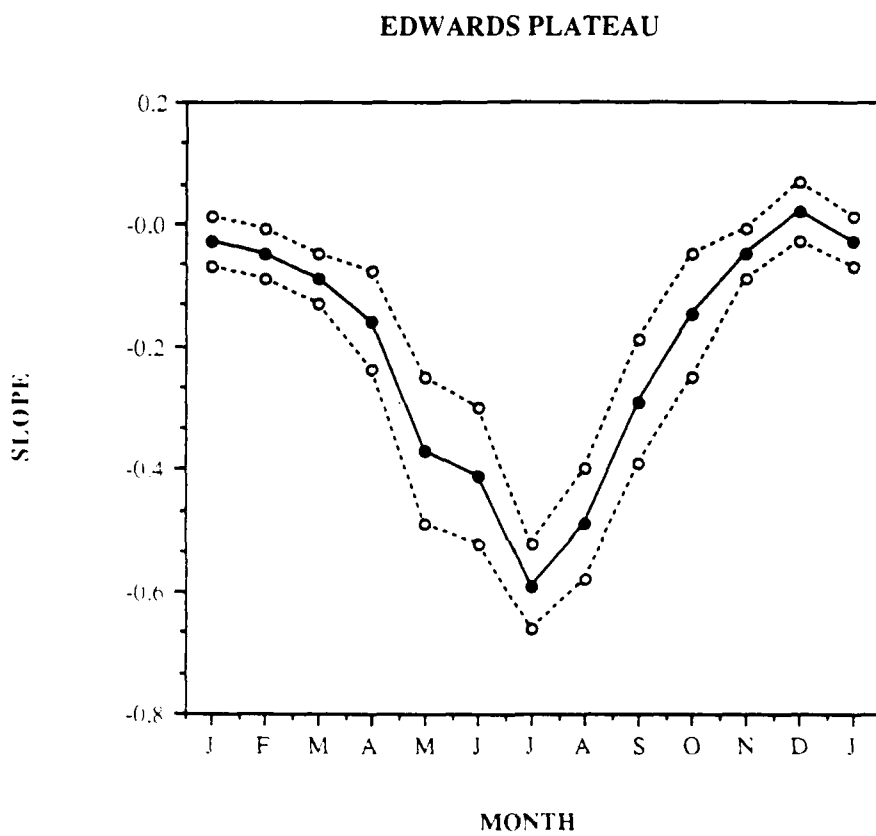


Figure 30. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the Edwards Plateau.

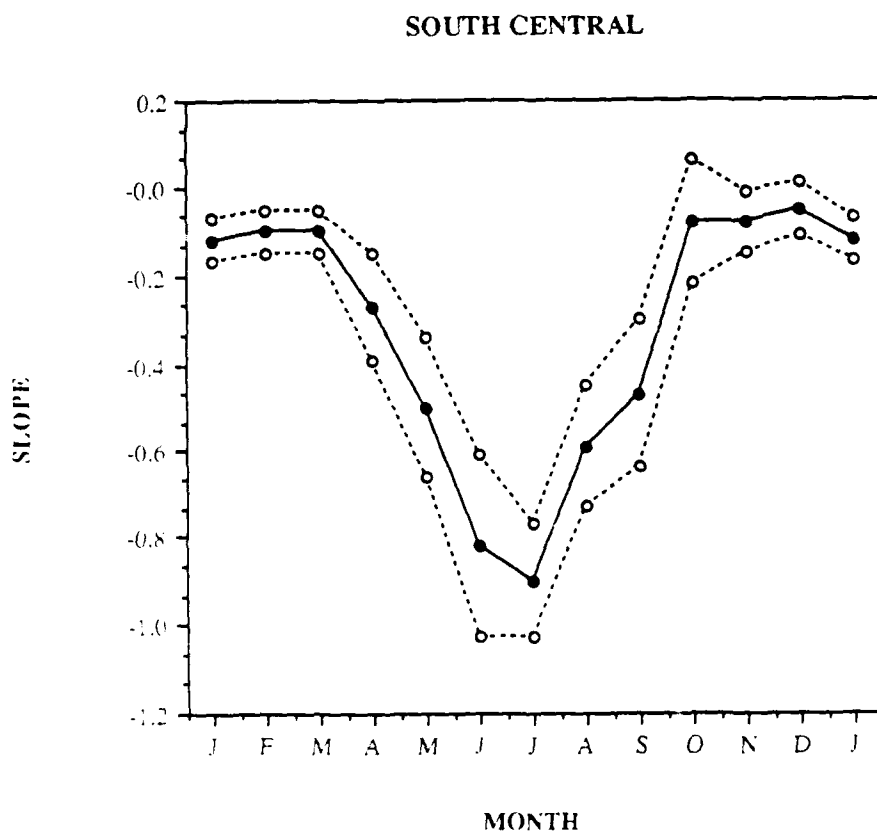


Figure 31. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for South Central Texas.

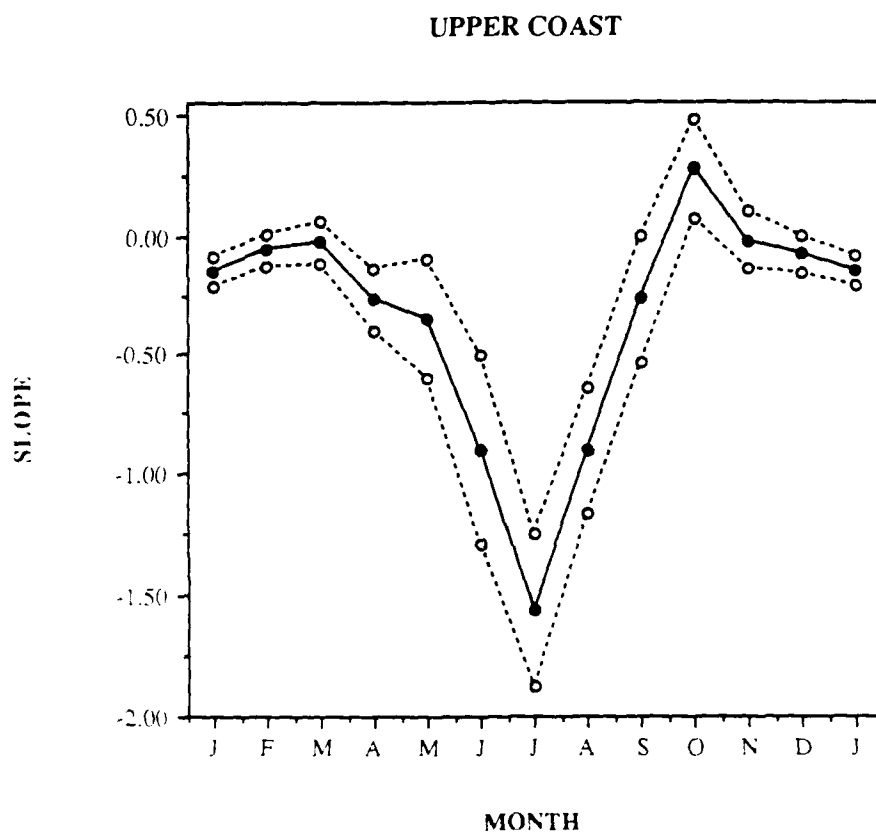


Figure 32. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the Upper Coast.

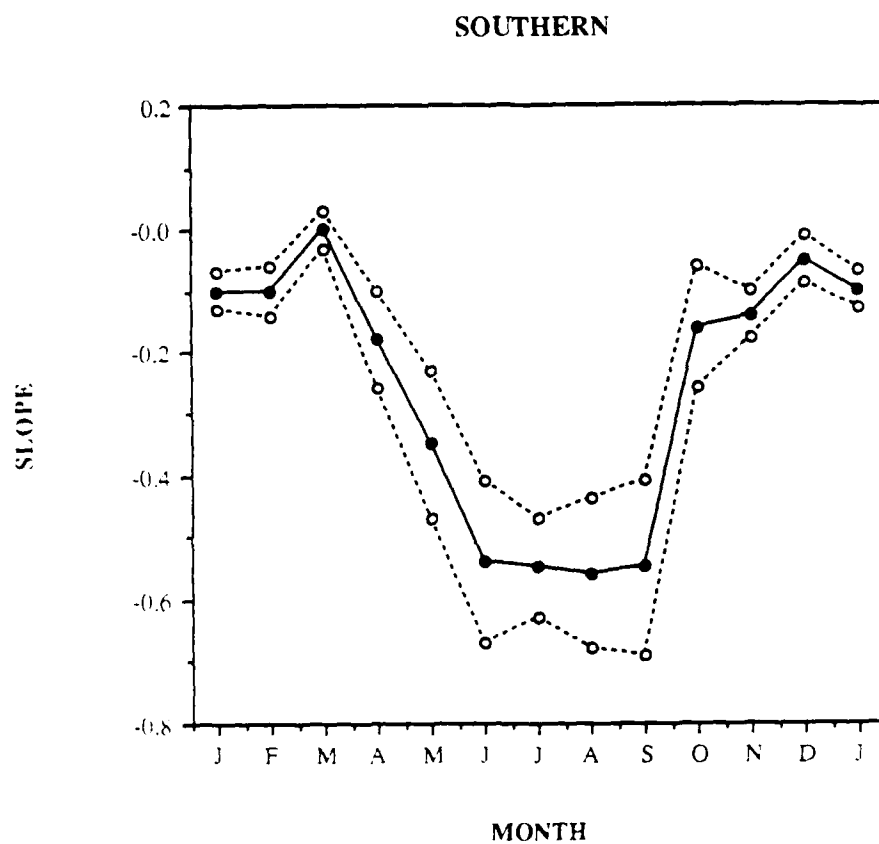


Figure 33. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for Southern Texas.

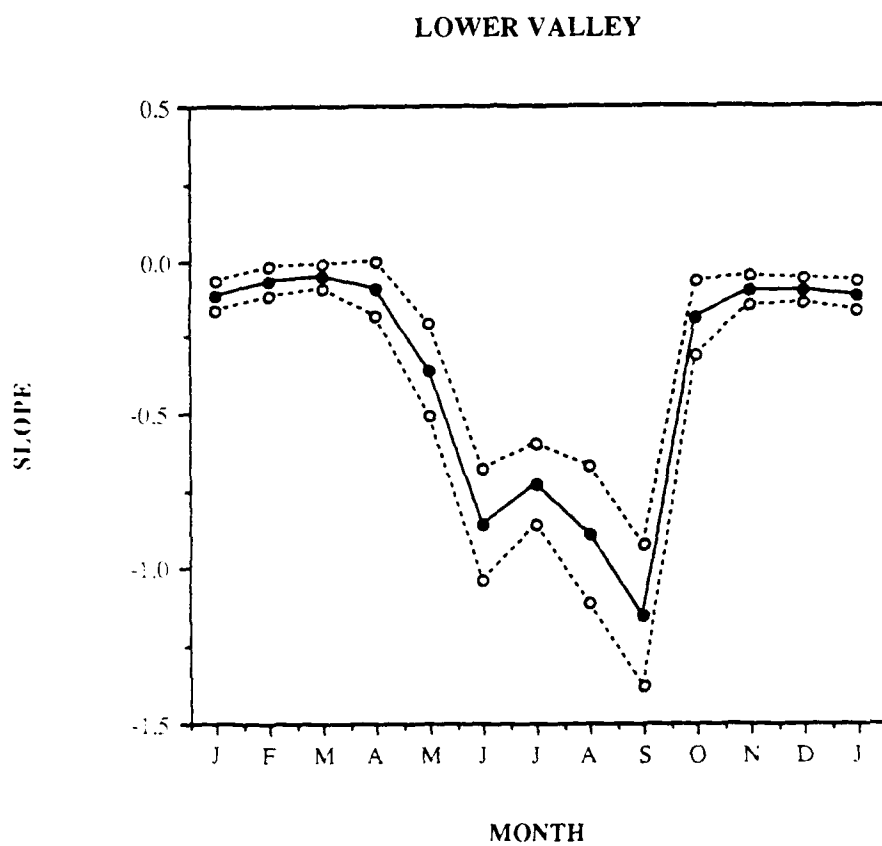


Figure 34. Annual distribution of the slope (solid line) and the standard error of the slope (dashed lines) of the regression line of precipitation on mean temperature for the Lower Valley.

slopes become positive during the fall and winter months. Comparing Figures 25 through 34, there are several noticeable differences in slopes across the state:

(1) Ranges in slope, or the differences between maximum and minimum slope values during the year, are typically larger in humid areas of the state and become smaller in drier regions (Table 6). This is reflected in comparing a range of 1.84 in the Upper Coast division to a range of 0.32 in the Trans Pecos.

Table 6. Maximum and minimum values of the slope (with month of occurrence) and the range of slope for the regression line of MMP on MMT for each climatic division.

Division	Maximum Slope	Minimum Slope	Slope Range
High Plains	- 0.03 (Dec)	- 0.47 (Jul)	0.44
Low Plains	+ 0.03 (Dec)	- 0.46 (Jul)	0.49
North Central	+ 0.04 (Dec)	- 0.51 (Jun)	0.55
East Texas	+ 0.07 (Oct)	- 0.54 (Jun)	0.61
Trans Pecos	- 0.03 (Apr)	- 0.35 (Jul)	0.32
Edw. Plateau	+ 0.02 (Dec)	- 0.59 (Jul)	0.61
South Central	- 0.05 (Dec)	- 0.90 (Jul)	0.85
Upper Coast	+ 0.28 (Oct)	- 1.56 (Jul)	1.84
Southern	+ 0.00 (Mar)	- 0.56 (Jul)	0.56
Lower Valley	- 0.05 (Mar)	- 1.15 (Sep)	1.10

(2) Magnitudes of negative slopes are generally larger in south and southeast portions of Texas and become less negative toward the west and

northwest. This suggests a direct relationship between slope and the proximity of a climatic division to the Gulf of Mexico.

(3) The number of months within any division for which the standard error of slope "oscillates about" the zero line (i.e., slope is either positive or negative) increases toward the east. In these situations, a reliable prediction of a change in precipitation cannot be made because the standard error of the slope indicates either an increase or decrease in precipitation is possible if temperatures rise. East Texas experiences seven such months while the High Plains, Trans Pecos, and Lower Valley experience none.

2. Relationship Between Evapotranspiration and Temperature

Monthly evaporation (ME_0) values are estimated using regression techniques outlined in Moe and Griffiths (1965). The equation used is a combination of equations (3) and (4) and can be rewritten as:

$$ME_0 = (E\text{-Intercept}) + \{(Slope) * [(MMT) + (MTRANGE * 1/2)]\} \quad (8)$$

MTRANGE values are plotted for selected cities across Texas and Louisiana and isopleths are drawn to estimate mean values of MTRANGE for each climatic division. Figure 35 provides an example of resulting MTRANGE during August. The same method is used to estimate MTRANGE for all other months (not shown). Values of ME_0 are converted to MPET using Lowther's modified version of the Penman method and are shown in Appendix C.

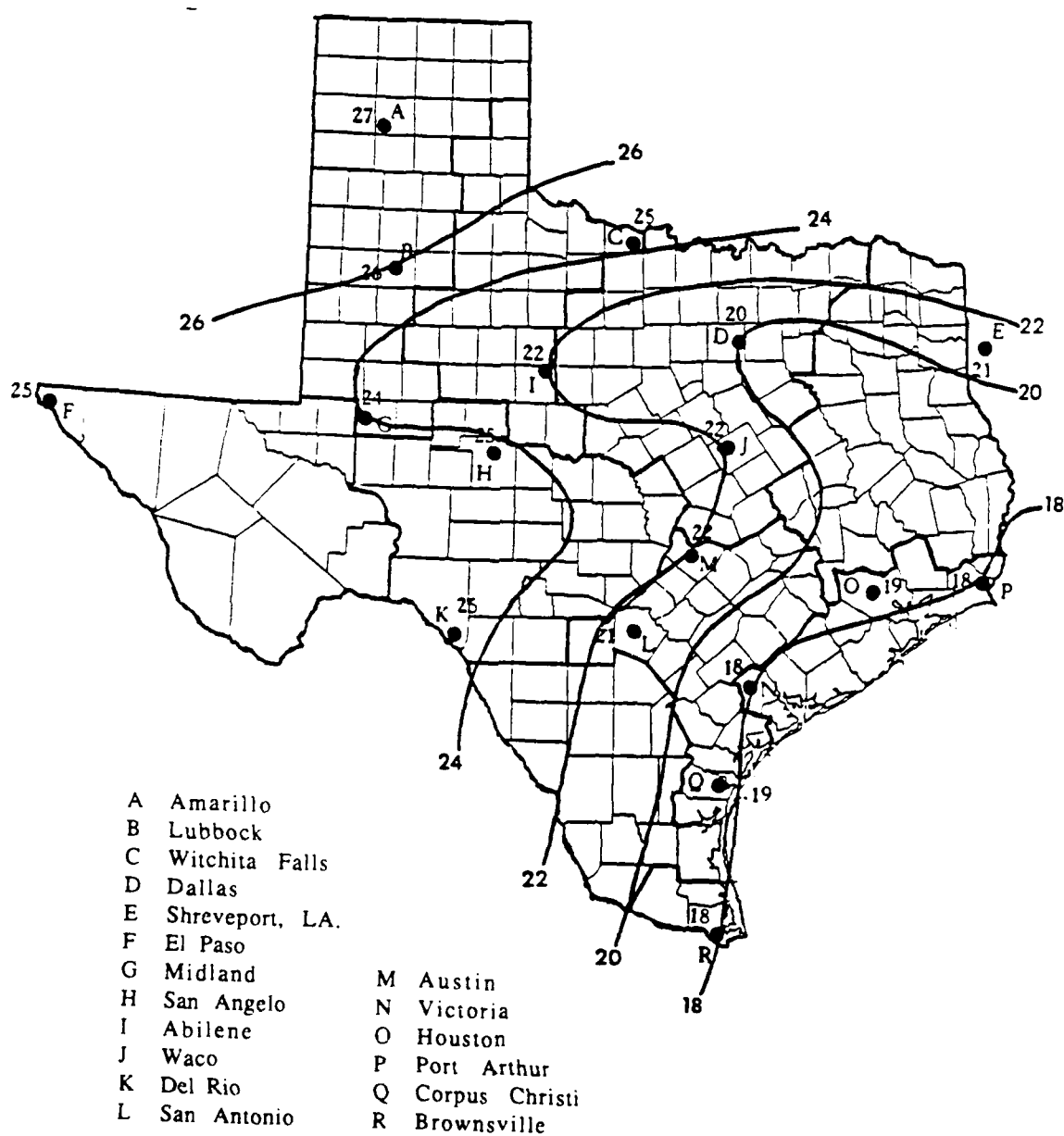


Figure 35. Isopleths of MTRANGE (in °F) for Texas during August.

B. A Control Soil Moisture Budget and a Soil Moisture Budget Based on a Warming Trend

The results for the control and predicted soil moisture budgets based on an assumed warming trend are presented in this section and tabulated in Appendix C. Results for the Low Rolling Plains, Trans Pecos, and Lower Valley show percent monthly soil moisture at 0% during all months for both the control and predicted moisture budgets. These results, or any results which indicate monthly soil moisture at 0%, should be viewed with caution. Since evapotranspiration is assumed to occur at the potential rate at all times (even when soil moisture is below permanent wilting) results may underestimate soil moisture (i.e., percent soil moisture may be higher than what is indicated).

The soil moisture regimes for the seven remaining divisions were plotted and examined based on the following scenarios:

(1) mean monthly temperatures increase uniformly and field capacity equals 4 inches of net soil water;

(2) mean monthly temperatures increase non-uniformly and field capacity equals 4 inches of net soil water;

(3) mean monthly temperatures increase uniformly and field capacity equals 6 inches of net soil water; and

(4) mean monthly temperatures increase non-uniformly and field capacity equals 6 inches of net soil water.

A horizontal line is drawn on all figures at the 15% level representing the lower base level at which water is available for plants. Soil moisture below this level indicates that plants may begin showing signs of heat stress. It is

not meant as an indicator of permanent wilting. Tables are provided at the end of each section which summarize the amount of time (in weeks) above permanent wilting for the control case and for each scenario as outlined above.

1. High Plains (Table 7)

Figures 36 through 39 display the soil moisture patterns for the High Plains for each scenario described above. The control moisture regime (solid line) for all four scenarios reveals adequate soil moisture is available during winter only, even though precipitation is minimum during this season. During all other seasons, mean monthly precipitation amounts cannot keep up with the increasing rates of evapotranspiration. As temperature increase in the model, the change in soil moisture is quite dramatic. For just a 1°F rise in mean temperature, the soil moisture regime is below 15% available soil moisture during the entire year in all but one of the scenarios (Fig. 36). If temperatures rise 2°F, soil moisture is reduced by at least 50% from the control regime during fall and winter months. Percent soil moisture is reduced to near zero the entire year if temperatures increase by as much as 4°F.

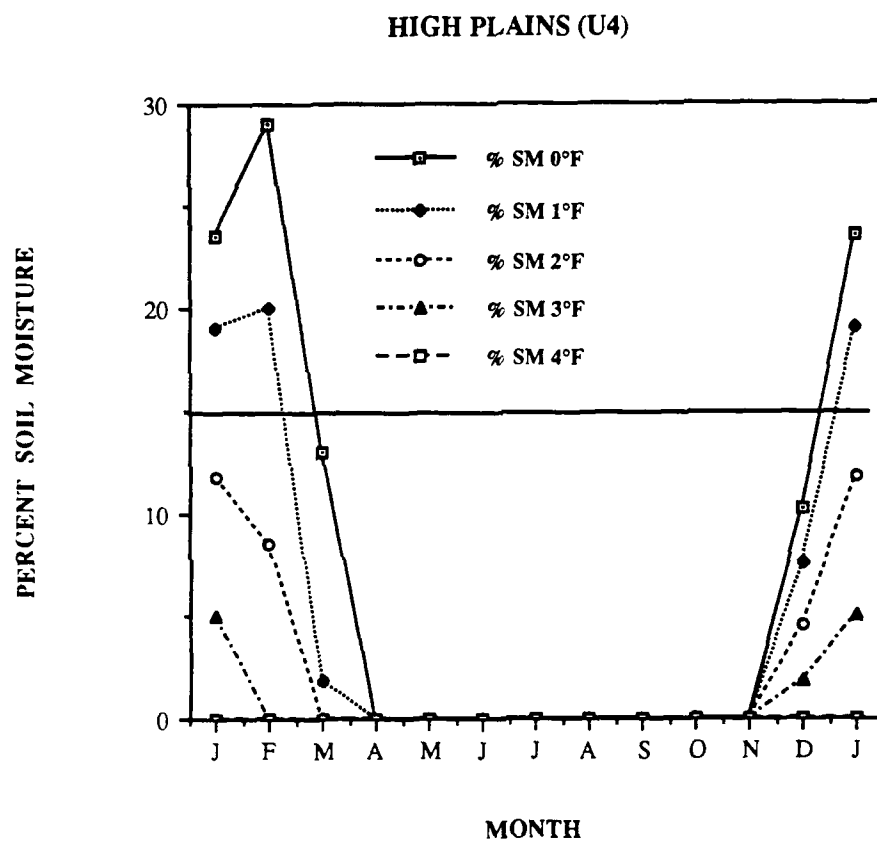


Figure 36. Percentage of monthly soil moisture (SM) for the High Plains for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

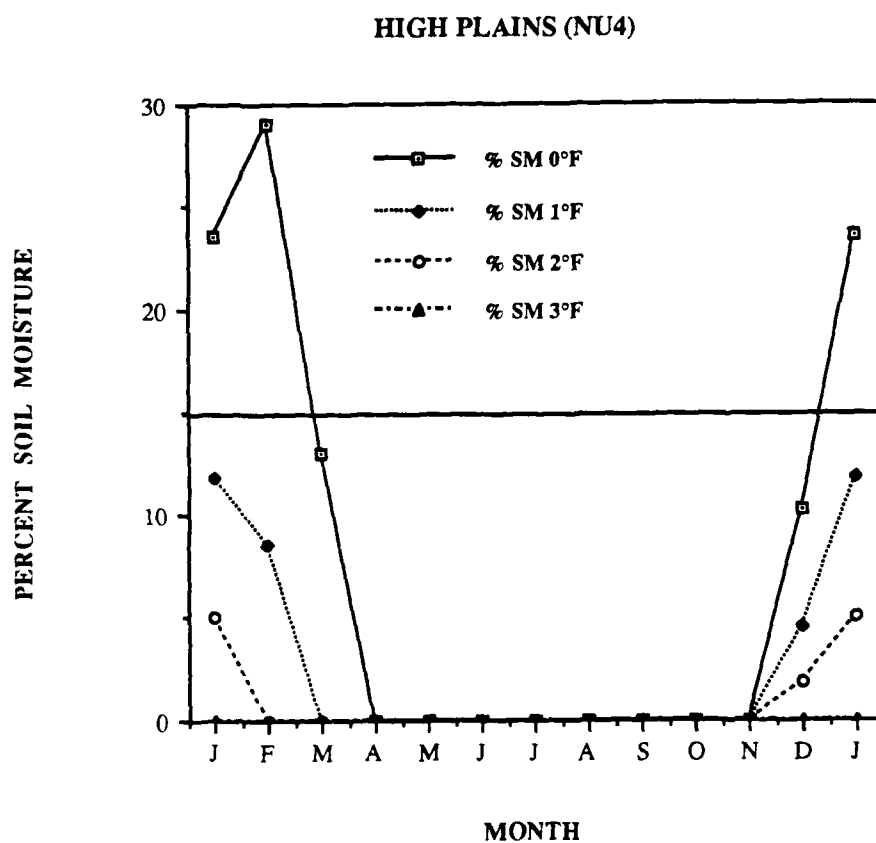


Figure 37. Percentage of monthly soil moisture (SM) for the High Plains for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

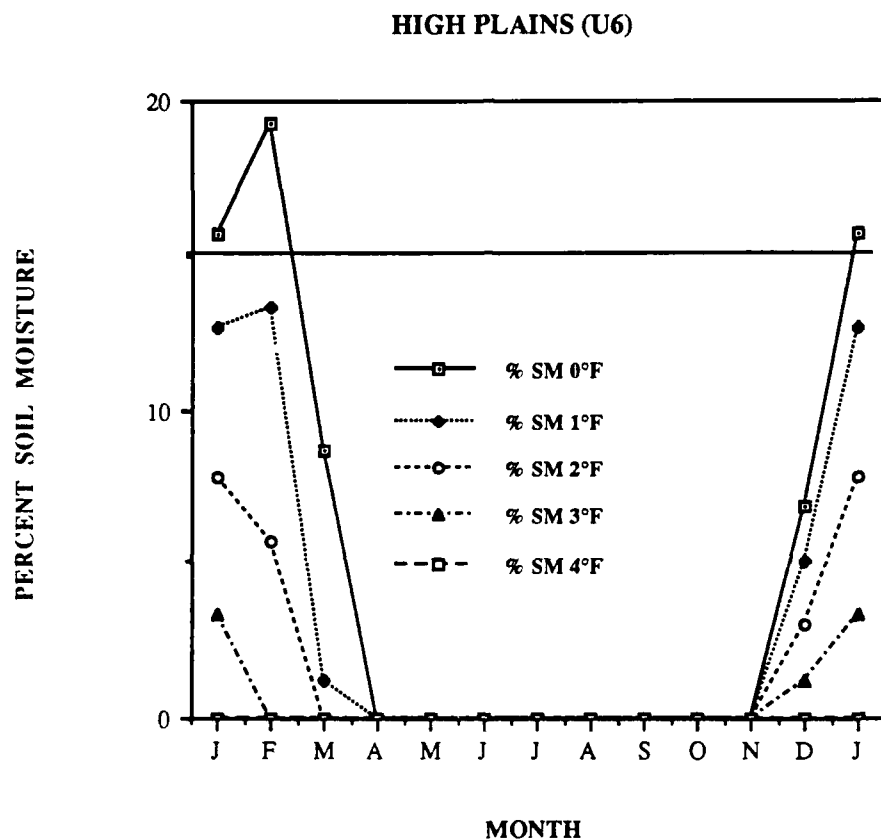


Figure 38. Percentage of monthly soil moisture (SM) for the High Plains for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

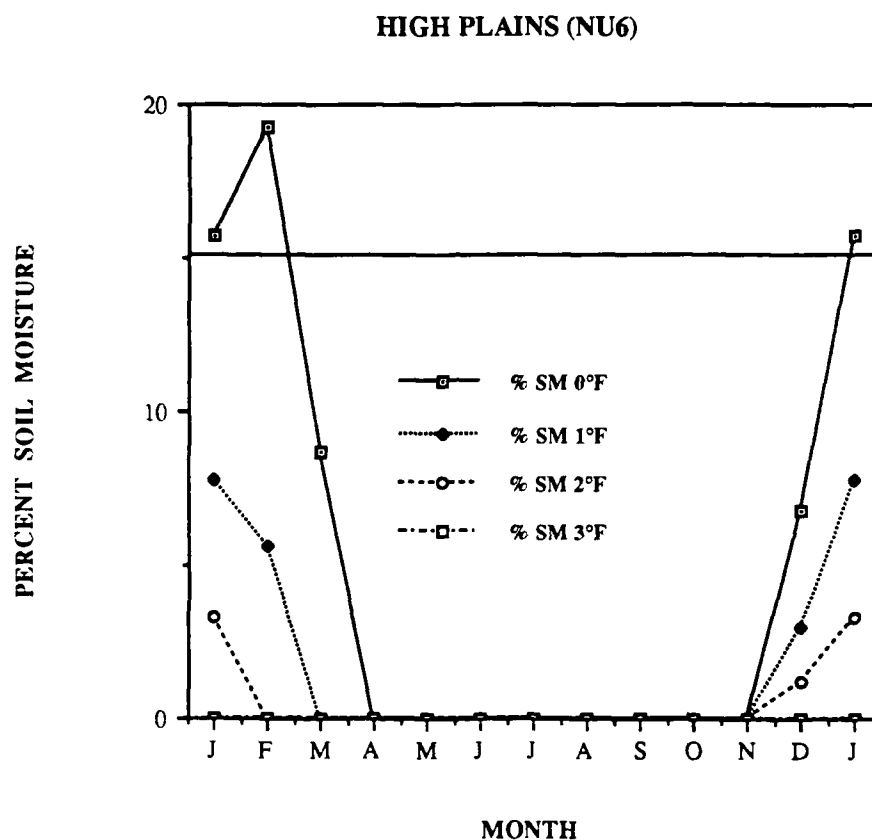


Figure 39. Percentage of monthly soil moisture (SM) for the High Plains for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

Table 7: Approximate number of weeks above 15% available soil moisture (lower base level) for the High Plains Division for a uniform (U) and non-uniform (NU) rise in temperature while assuming field capacity is equal to 4 (U4 and NU4) and 6 (U6 and NU6) inches of net soil water.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	9	6	0	0	0
U6	6	0	0	0	0
NU4	9	0	0	0	0
NU6	6	0	0	0	0

2. North Central (Table 8)

Figures 40 through 43 display the soil moisture regime for the North Central Division. The control cases (solid lines) reveal sufficient soil moisture from mid-winter to late spring, which coincides with the period of maximum precipitation for this region. As the jet stream and associated storm track shifts northward during the hot summer months and the subtropical high strengthens, large-scale subsidence often dominates the weather pattern. Thus, evapotranspiration exceeds precipitation which results in very little moisture in the soil. For each 1°F rise in temperature between 1°F and 4°F, soil moisture is typically reduced by 10%-20%. If temperatures rise 4°F, about 3 months of the year are added to the soil moisture regime below 15% available soil moisture.

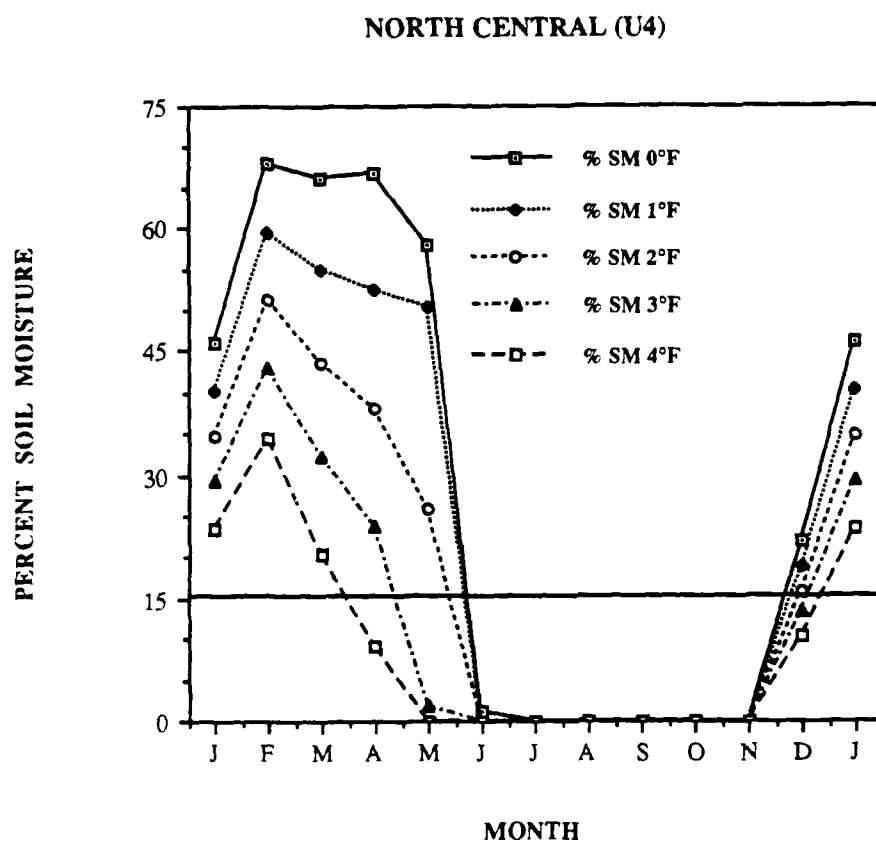


Figure 40. Percentage of monthly soil moisture (SM) for North Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

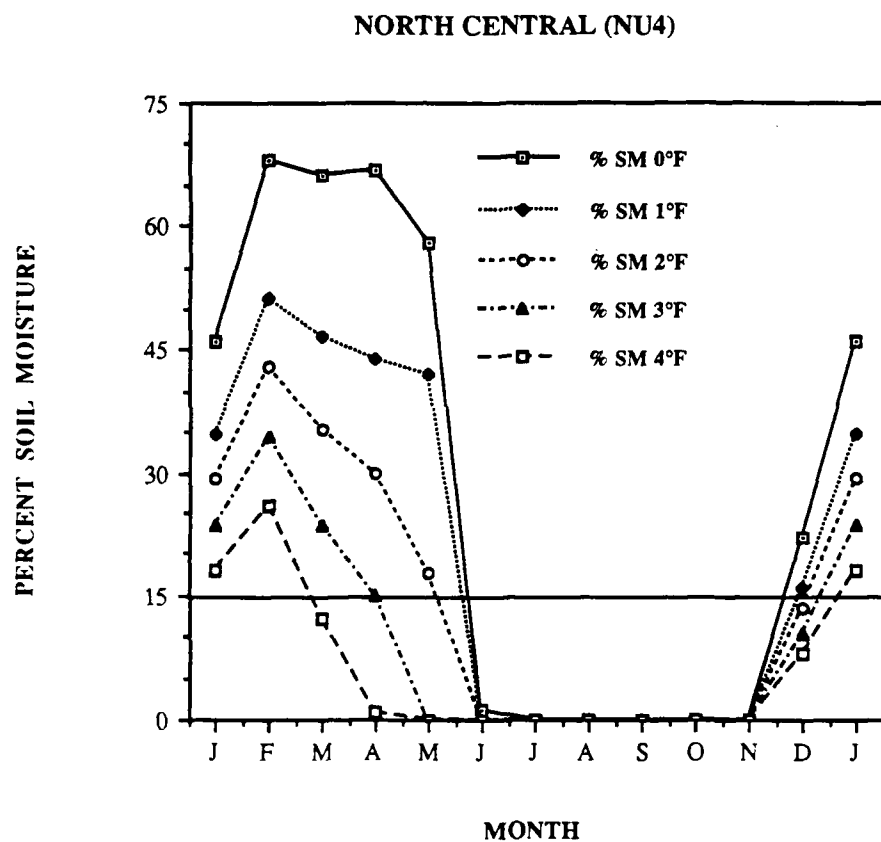


Figure 41. Percentage of monthly soil moisture (SM) for North Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

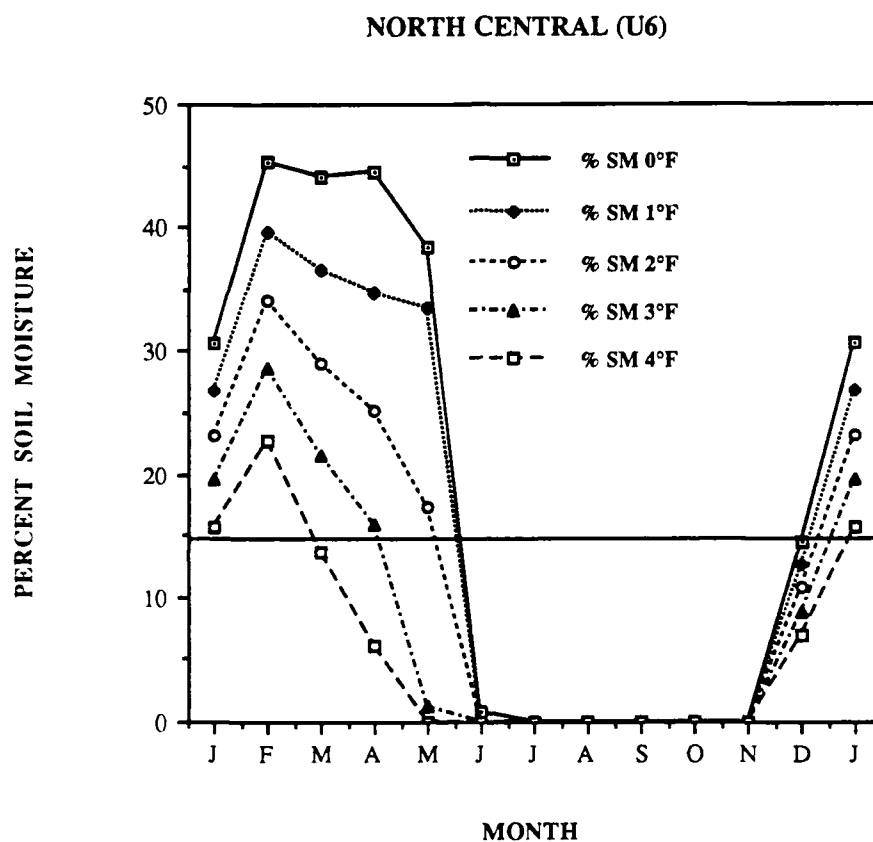


Figure 42. Percentage of monthly soil moisture (SM) for North Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

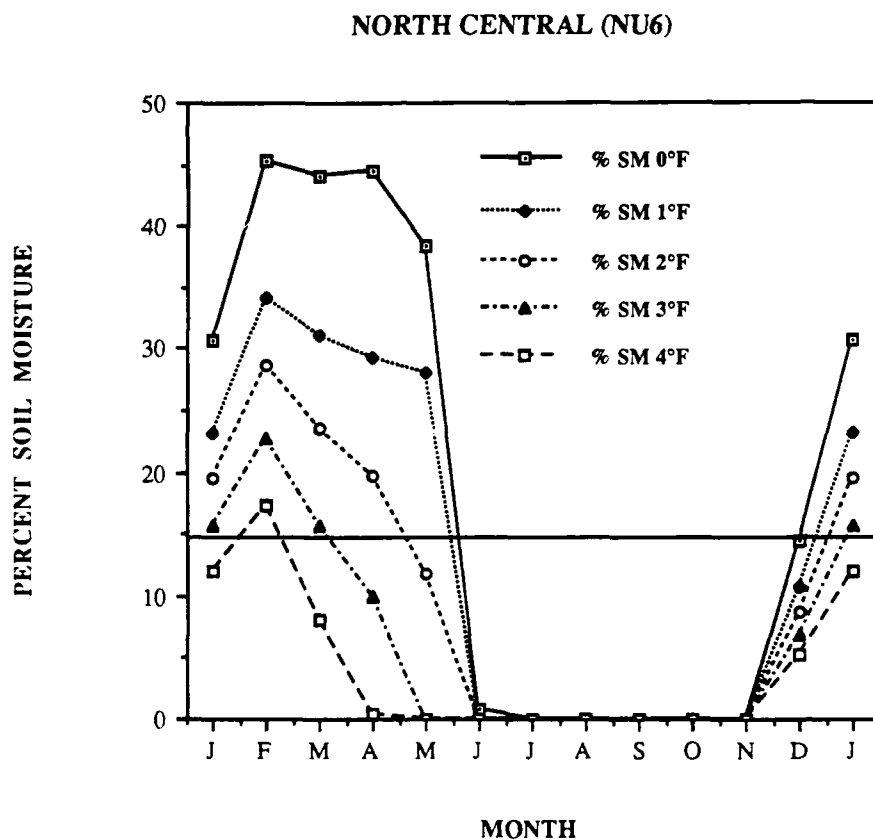


Figure 43. Percentage of monthly soil moisture (SM) for North Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

Table 8: Same as Table 7, except for North Central Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	26	25	23	18	14
U6	24	23	19	14	8
NU4	26	25	21	14	7
NU6	24	22	17	9	3

3. East Texas (Table 9)

The soil moisture regimes for the East Texas Division are shown in Figures 44 through 47. The control case yielded abundant soil moisture the entire year when field capacity was assumed to equal 6 inches of net soil water (Figs. 46 and 47). In fact, August and September were the only months below 40% soil moisture during the year. The control case in which field capacity was assumed to equal 4 inches of net soil water resulted in a slightly different regime (Figs. 44 and 45). A two month period between late July and late September found soil moisture below 15% available soil moisture. The control soil moisture regimes for both these cases seem reasonable. East Texas typically receives 46 inches of precipitation in a year and precipitation amounts are well distributed throughout most of the year. Maximum precipitation occurs in the spring and fall months, when active frontal systems are most frequent. Minimum precipitation occurs during summer, during which most precipitation develops from non-frontal, or air-mass type, thunderstorms. The soil moisture regimes for the control cases seem to follow

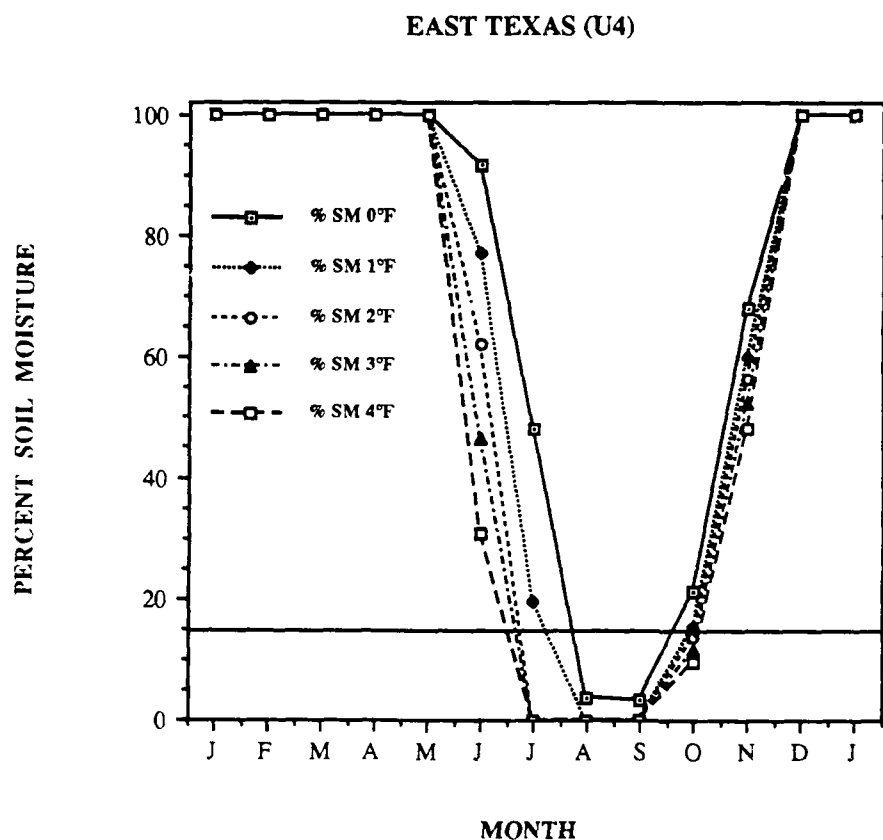


Figure 44. Percentage of monthly soil moisture (SM) for East Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

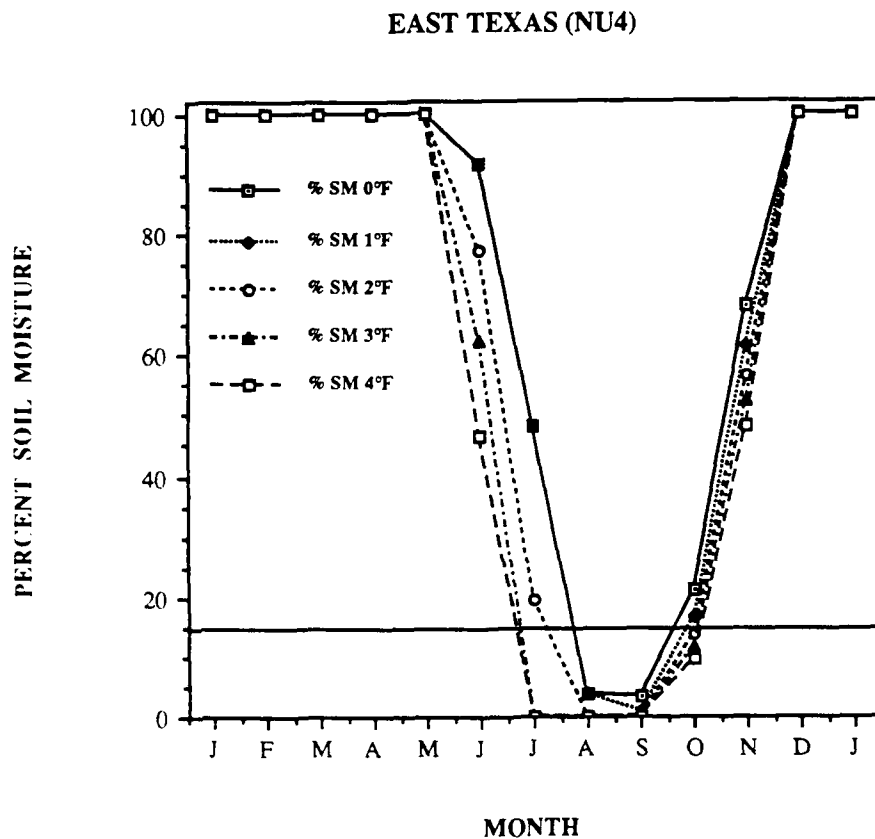


Figure 45. Percentage of monthly soil moisture (SM) for East Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

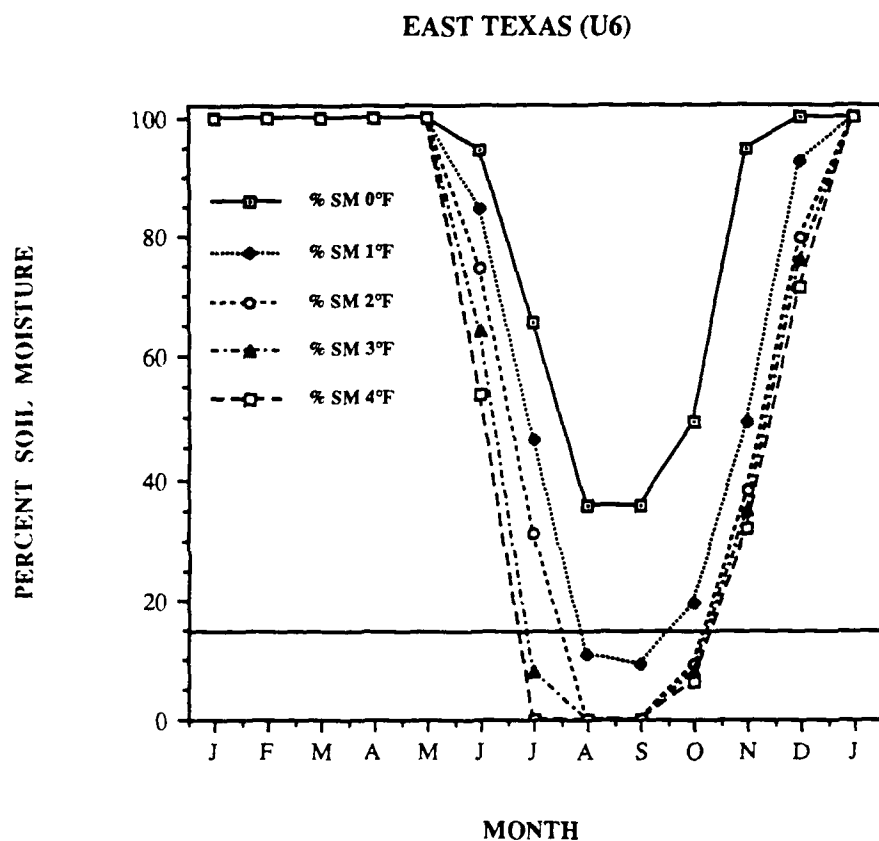


Figure 46. Percentage of monthly soil moisture (SM) for East Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

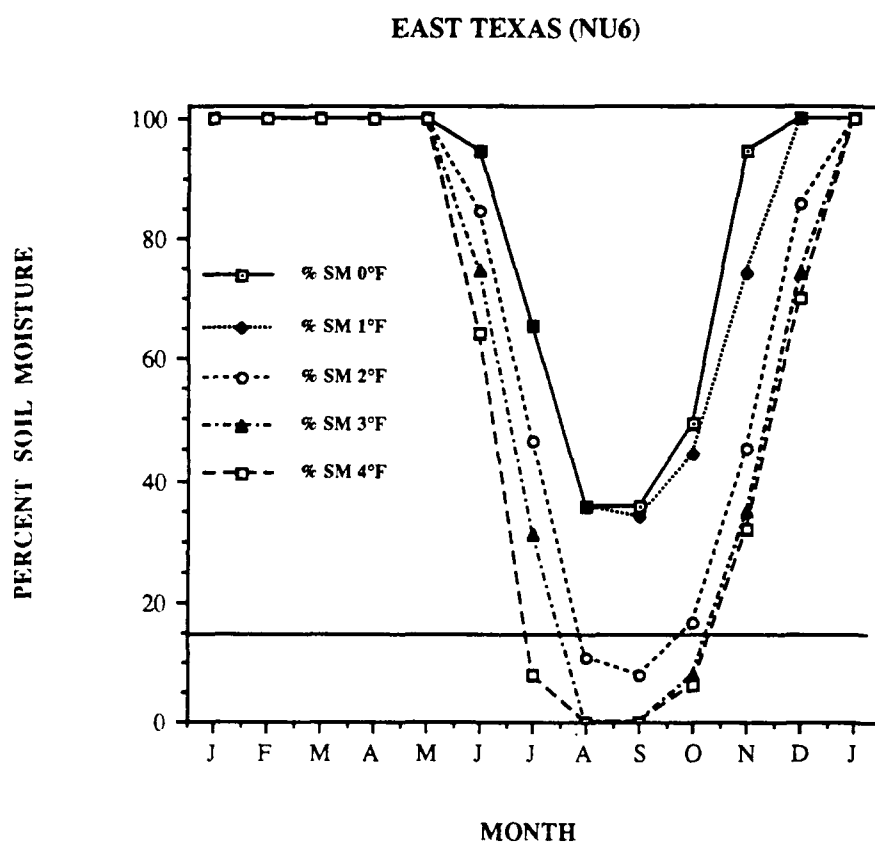


Figure 47. Percentage of monthly soil moisture (SM) for East Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

the annual distribution of rainfall in East Texas quite well. As temperatures are allowed to increase in the model, only small changes in soil moisture are detected. However, the changes in soil moisture should not be taken too lightly. For example, if mean temperatures increase 2°F (for both a uniform and non-uniform temperature rise) and field capacity is 6 inches, the resulting soil moisture regime during late summer and early fall drops below 15% available soil moisture for over 2 months (Figs. 46 and 47). Thus, drastic changes in soil moisture are possible even in areas where rainfall is now plentiful all year.

Table 9. Same as Table 7, except for East Texas Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	44	41	39	38	38
U6	52	46	42	39	38
NU4	44	43	41	39	38
NU6	52	52	44	41	38

4. Edwards Plateau (Table 10)

Figures 48 through 51 display the soil moisture regimes for the Edwards Plateau. The resulting control soil moisture regimes for each scenario are similar to the regimes found in the High Plains, although moisture supply is a little more plentiful in the Plateau region. Soil moisture is available to plants through most of the winter due to low evapotranspiration rates. However,

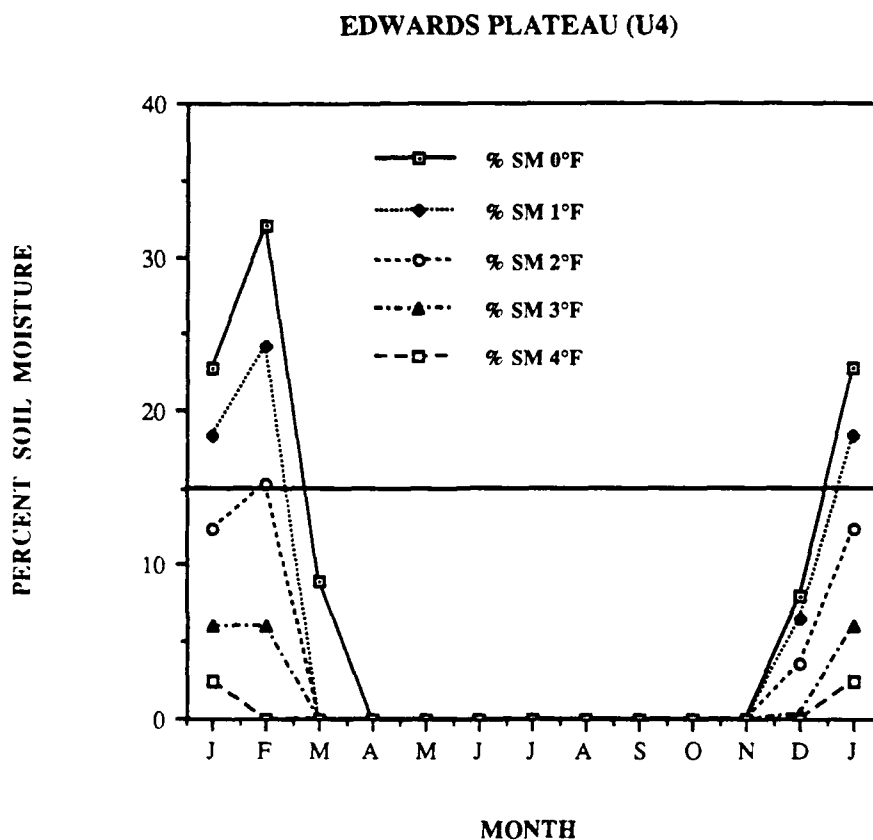


Figure 48. Percentage of monthly soil moisture (SM) for the Edwards Plateau for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

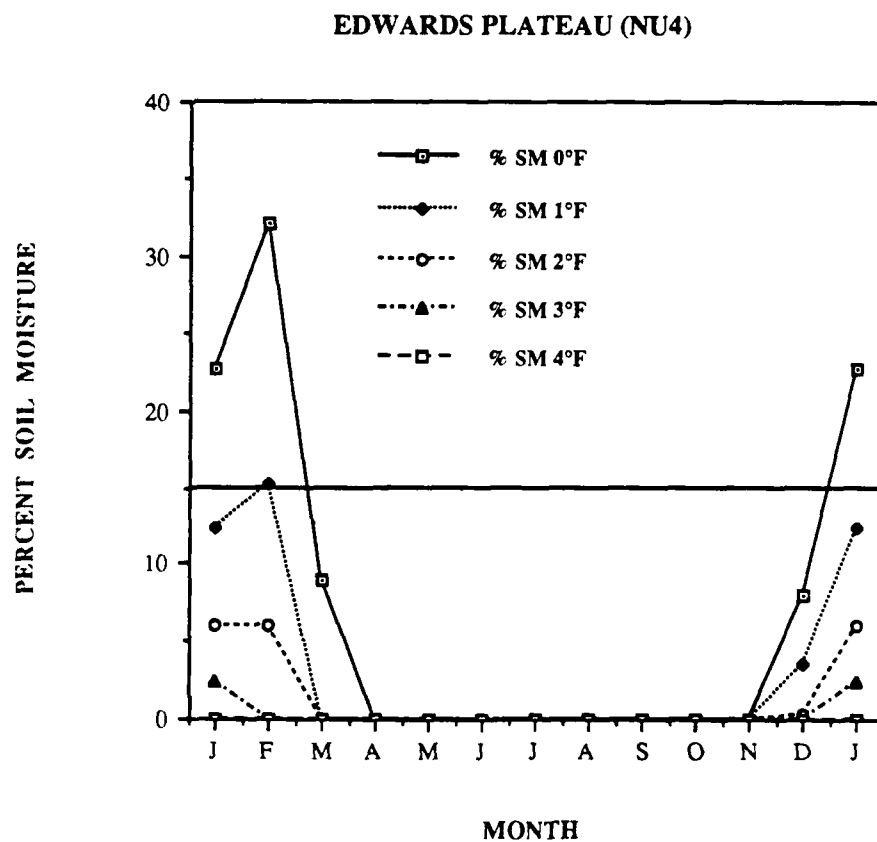


Figure 49. Percentage of monthly soil moisture (SM) for the Edwards Plateau for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

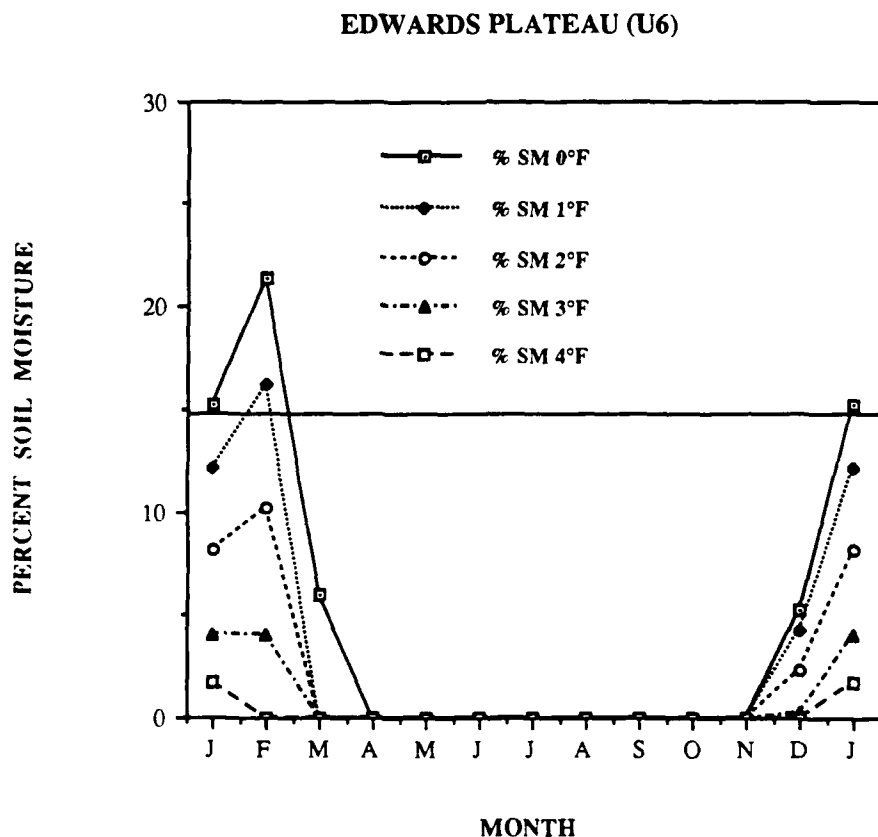


Figure 50. Percentage of monthly soil moisture (SM) for the Edwards Plateau for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

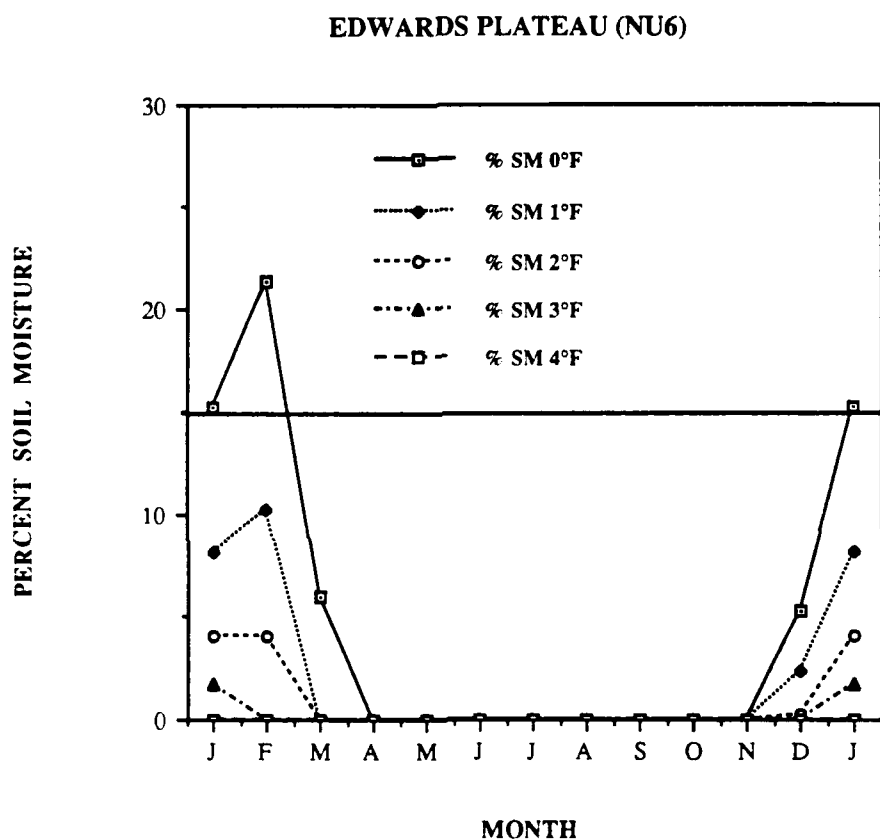


Figure 51. Percentage of monthly soil moisture (SM) for the Edwards Plateau for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

between January and March, the mean monthly temperature increases about 12°F while mean monthly precipitation increases only 0.18 inches. This leads to a significant reduction in soil moisture between winter and spring. From April to November, little moisture is present in the soil on a monthly basis and crops grow very little unless adequate irrigation techniques are available. As the mean monthly temperature is assumed to increase, reductions in soil moisture are significant. An increase in mean temperature of 2°F results in a soil moisture regime falling near or 15% available soil moisture the entire year. A 4°F rise leads to very little, if any, moisture present in the soil.

Table 10. Same as Table 7, except for Edwards Plateau Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	7	6	1	0	0
U6	6	2	0	0	0
NU4	7	1	0	0	0
NU6	6	0	0	0	0

5. South Central (Table 11)

Soil moisture is plentiful in the South Central Division during most months of the year. Between July and August rainfall amounts typically average only 5 inches during a time when monthly evapotranspiration rates are maximum. This leads to a soil moisture regime in late summer which is below 15% available soil moisture (Figs. 52-55). Precipitation amounts reach a

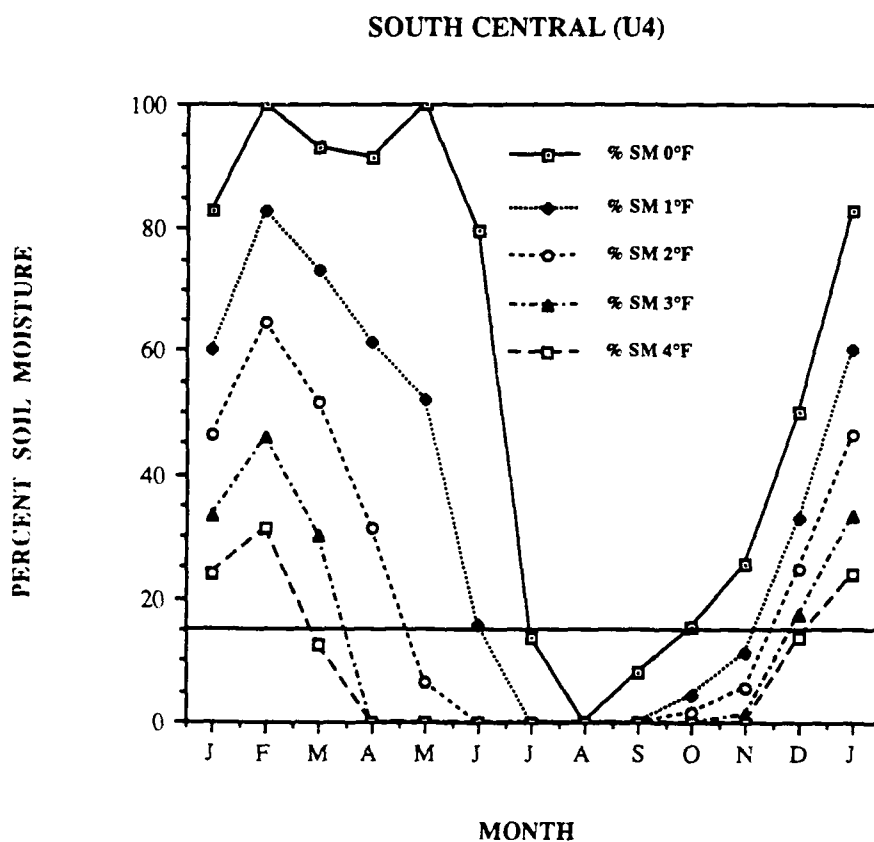


Figure 52. Percentage of monthly soil moisture (SM) for South Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

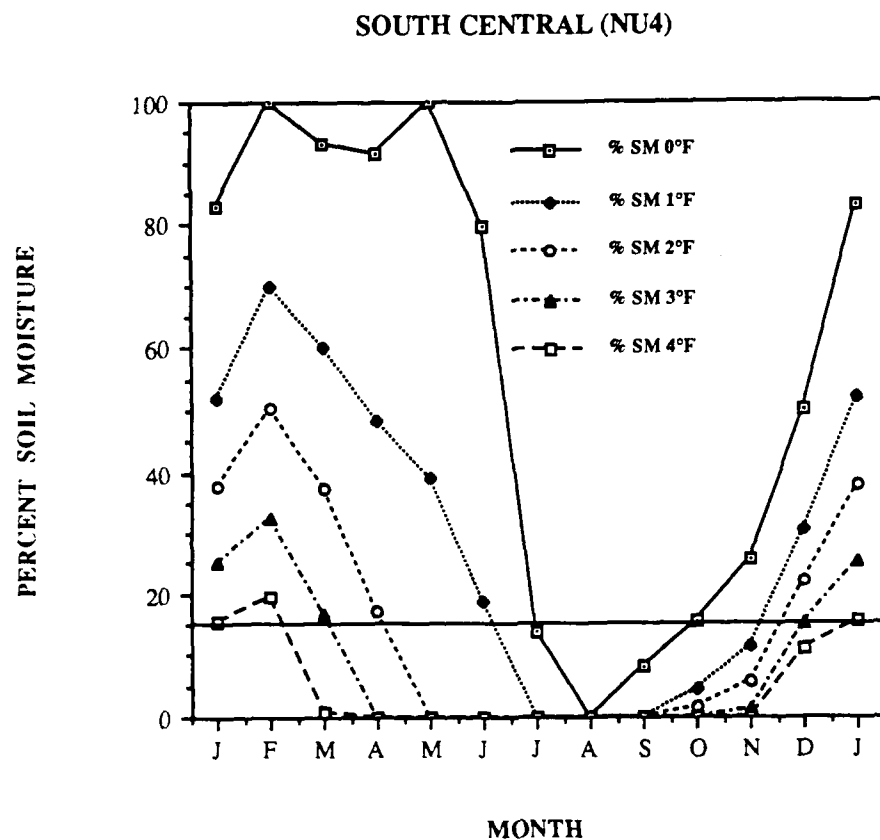


Figure 53 Percentage of monthly soil moisture (SM) for South Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

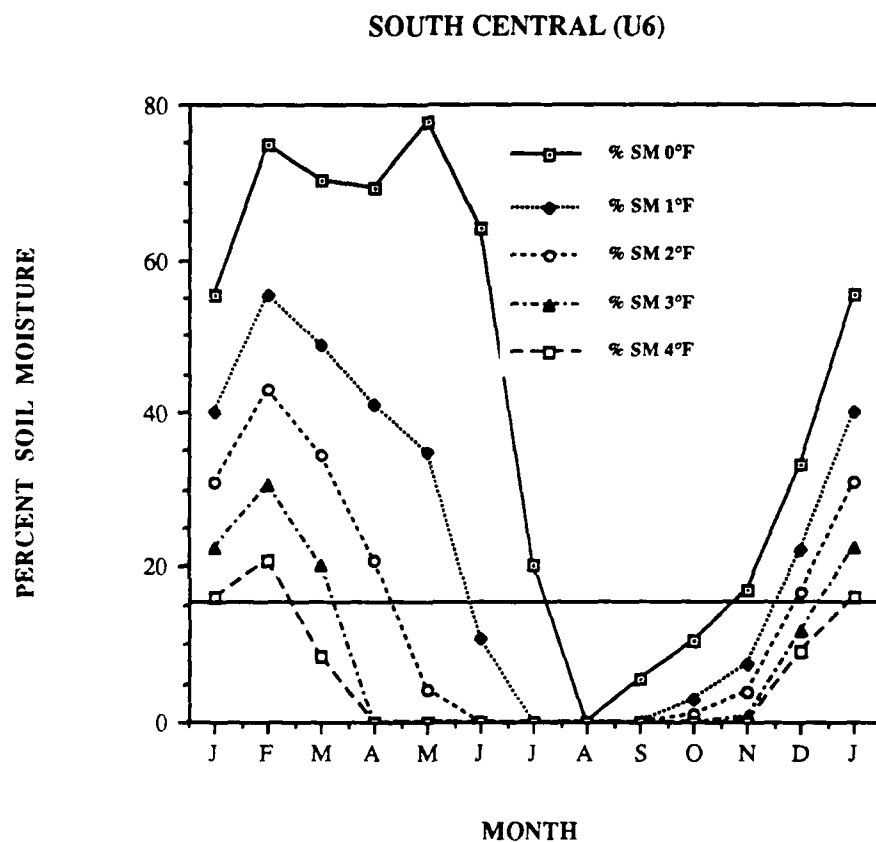


Figure 54. Percentage of monthly soil moisture (SM) for South Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

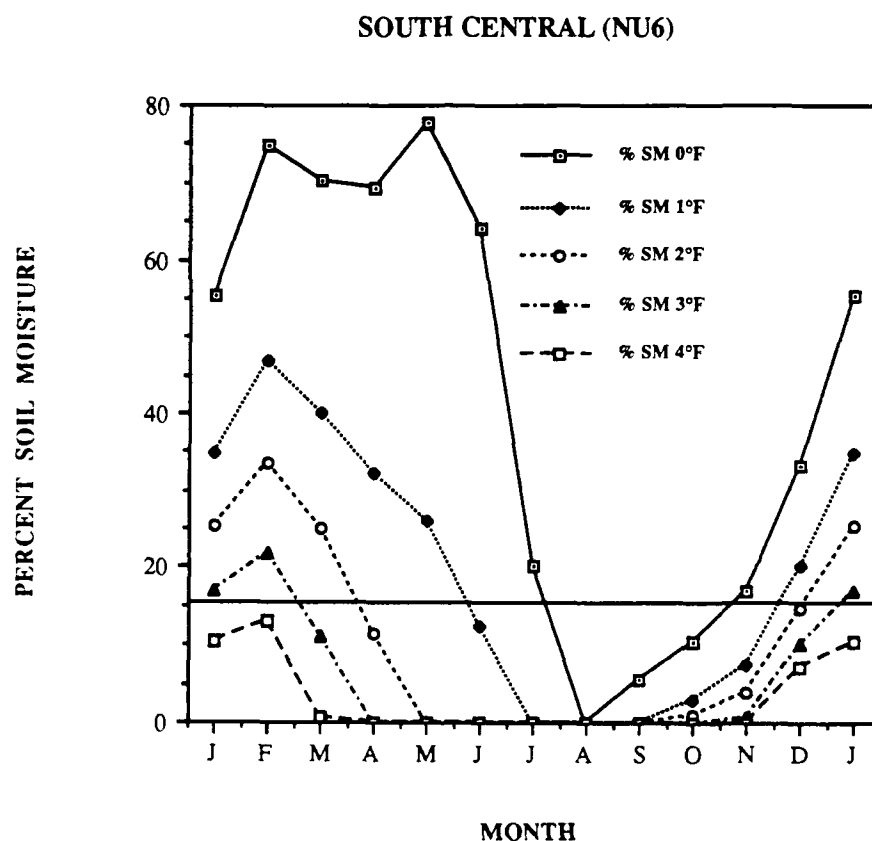


Figure 55. Percentage of monthly soil moisture (SM) for the South Central Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

maximum in early fall as the number and intensity of frontal systems increases and tropical activity from the Gulf of Mexico is maximum. This leads to a significant increase in soil moisture which continues into winter. As temperature increases 1°F in the model, soil moisture is reduced by *at least* 17% in each month. The number of months below 15% available soil moisture increases by three months in all scenarios when temperatures are assumed to increase by 2°F. For a 4°F rise, only two months of the year experience soil moisture above the lower base level.

Table 11. Same as Table 7, except for South Central Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	40	30	23	16	13
U6	38	28	20	13	8
NU4	40	29	20	13	8
NU6	38	27	16	9	0

6. Upper Coast (Table 12)

Like East Texas, the Upper Coast Division experiences a significant portion of Texas' mean annual precipitation (about 17%). The precipitation amounts are maximum between May and October and are minimum in late winter and early spring. Abundant precipitation helps contribute to a soil moisture regime that is plentiful the entire year (Figs. 56-59). Significant reductions in soil moisture during the summer are observed as temperatures

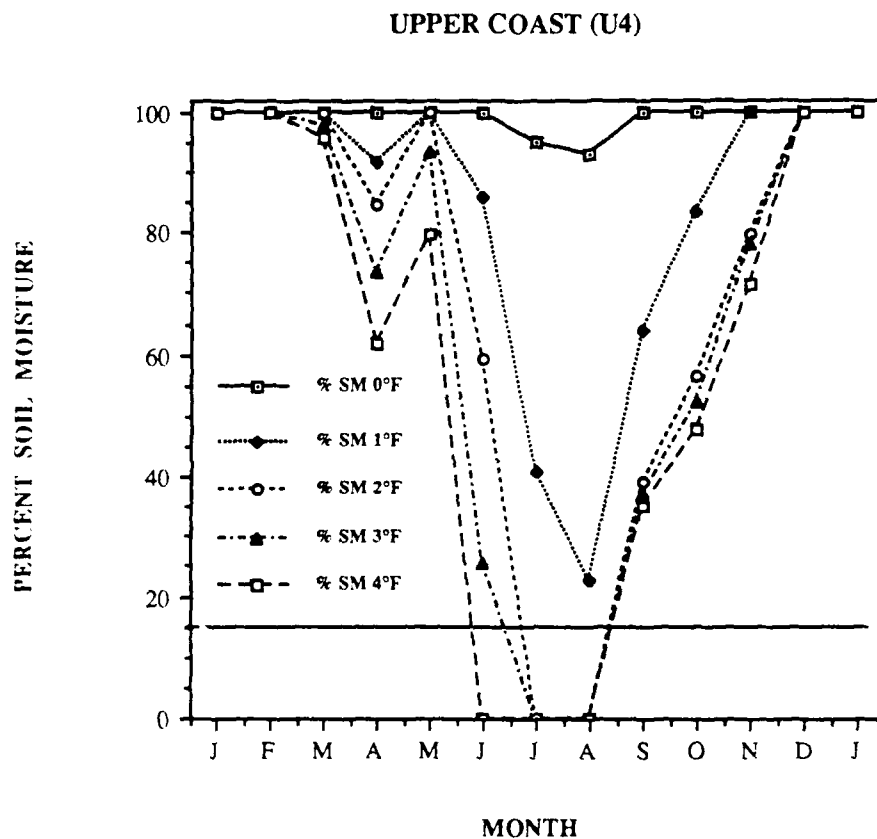


Figure 56. Percentage of monthly soil moisture (SM) for the Upper Coast for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

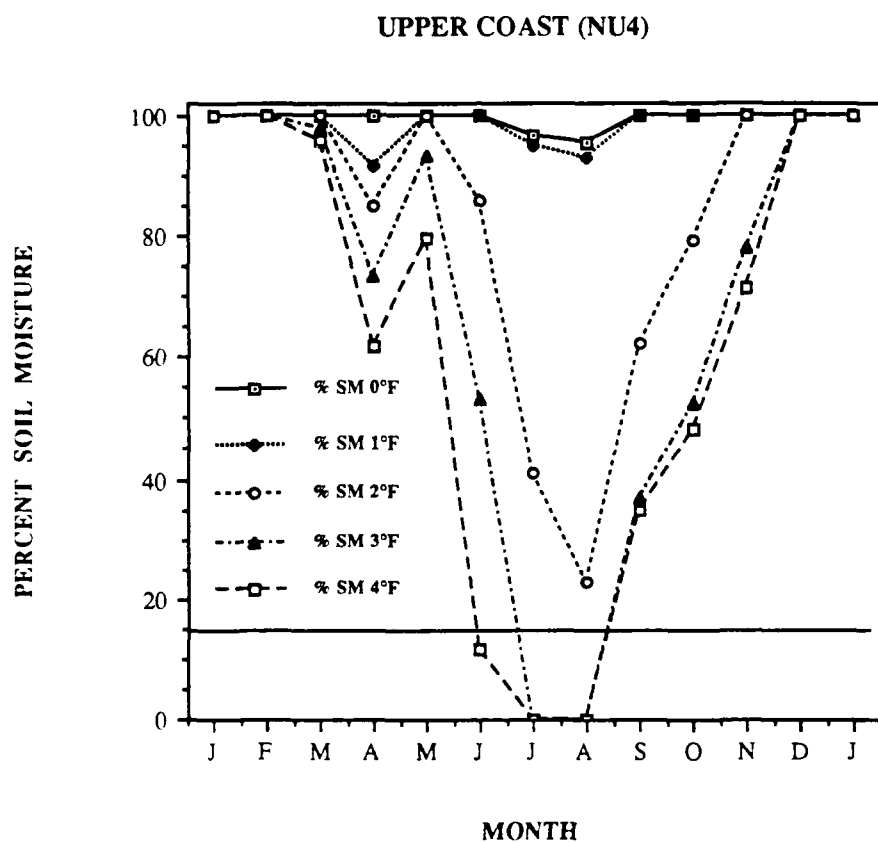


Figure 57. Percentage of monthly soil moisture (SM) for the Upper Coast for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

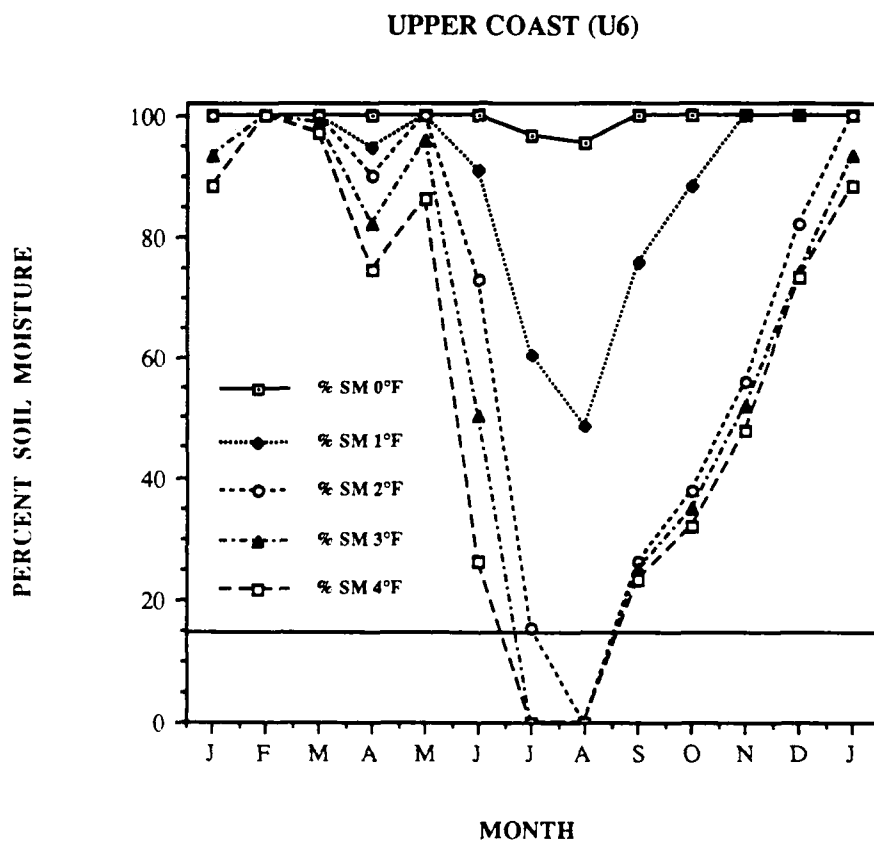


Figure 58. Percentage of monthly soil moisture (SM) for the Upper Coast for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

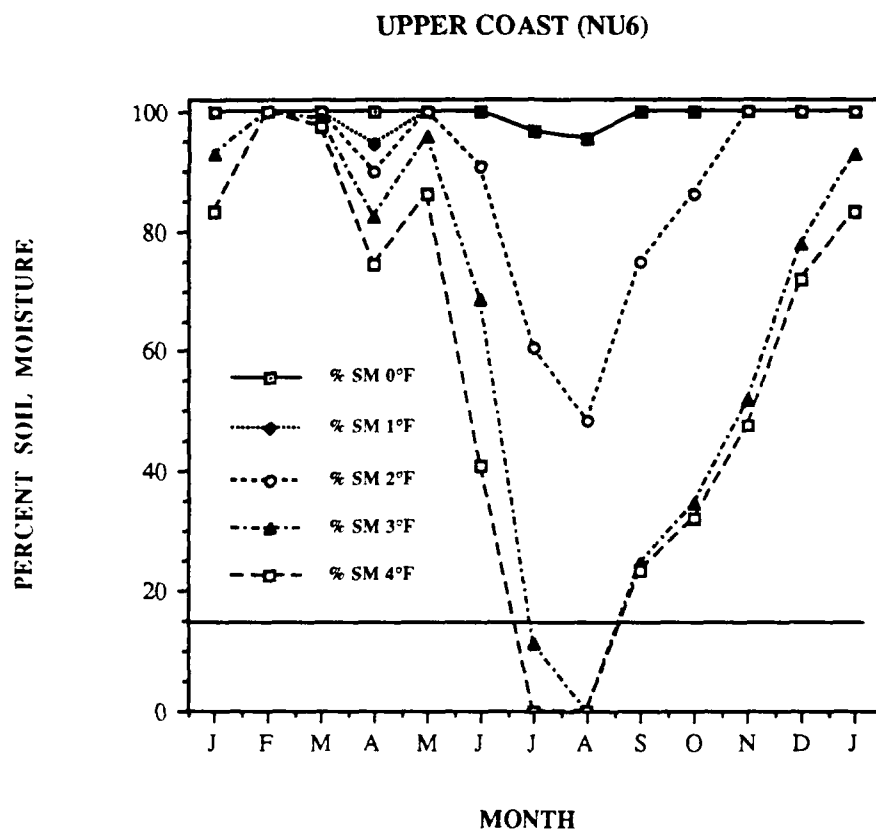


Figure 59. Percentage of monthly soil moisture (SM) for the Upper Coast for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

increase within the model. The change in soil moisture is reduced by 90% or more during summer if mean temperatures rise by as much as 4°F. For the same rise in temperature during fall, the soil moisture regime is reduced by as much as 60% in all four scenarios. In winter and spring, the change in soil moisture is less critical as temperatures increase in the model.

Table 12. Same as Table 7, except for Upper Coast Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	52	52	46	44	42
U6	52	52	46	44	43
NU4	52	52	52	46	42
NU6	52	52	52	46	43

7. Southern Texas (Table 13)

Figures 60 through 63 depict the soil moisture regime for Southern Texas. Soil moisture is available for plants during winter and early spring but is unavailable during the remainder of the year. The control budget appears reasonable while considering the climate in this part of the state. Although precipitation is minimal during the winter, evapotranspiration is also minimal due to cool temperatures and therefore precipitation exceeds evapotranspiration. Mean temperatures increase 13°F between January and March, yet mean precipitation falls from just over an inch to about 0.80 inches. This initiates a significant reduction in soil moisture from March to

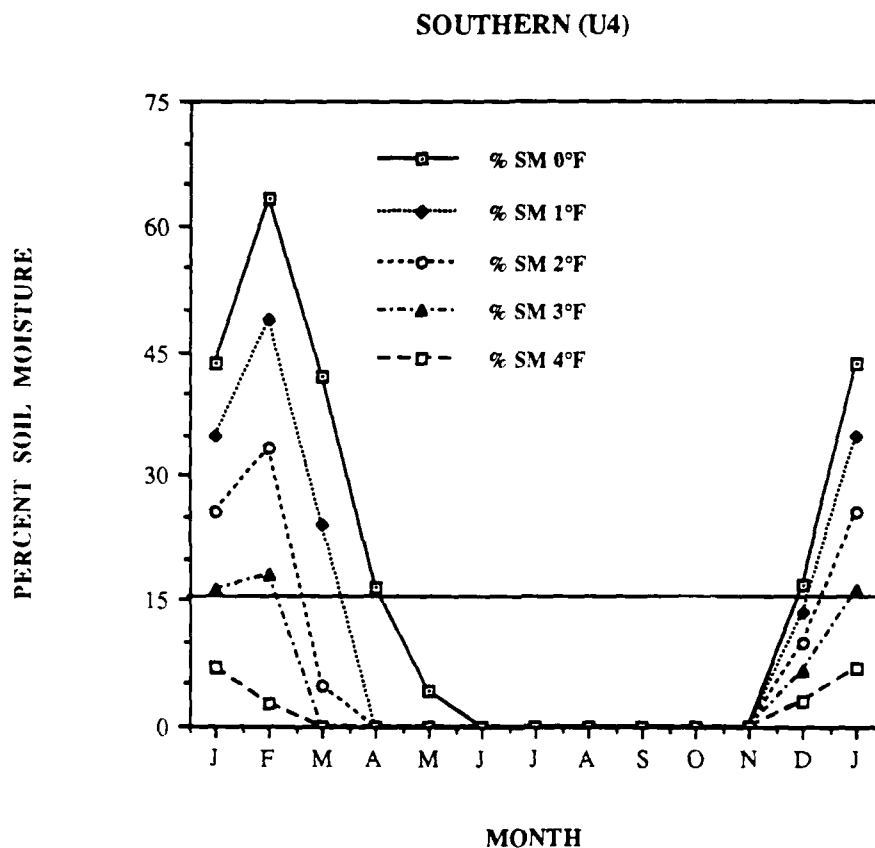


Figure 60. Percentage of monthly soil moisture (SM) for Southern Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

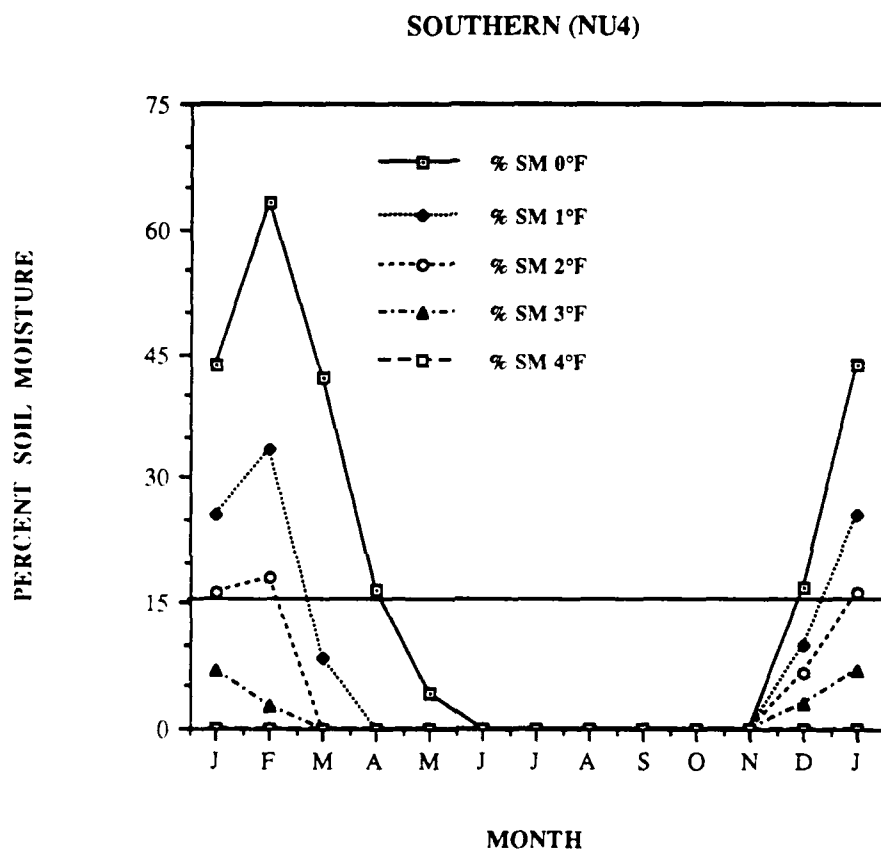


Figure 61. Percentage of monthly soil moisture (SM) for Southern Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 4 inches or greater. Results are significant at the 95% confidence interval.

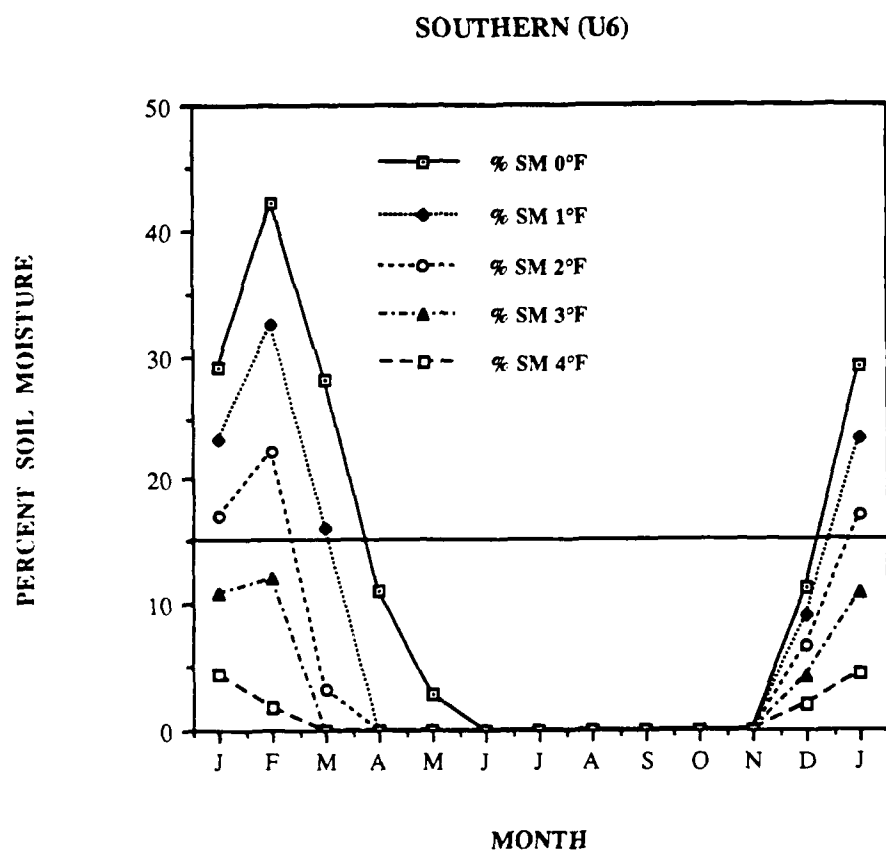


Figure 62. Percentage of monthly soil moisture (SM) for Southern Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

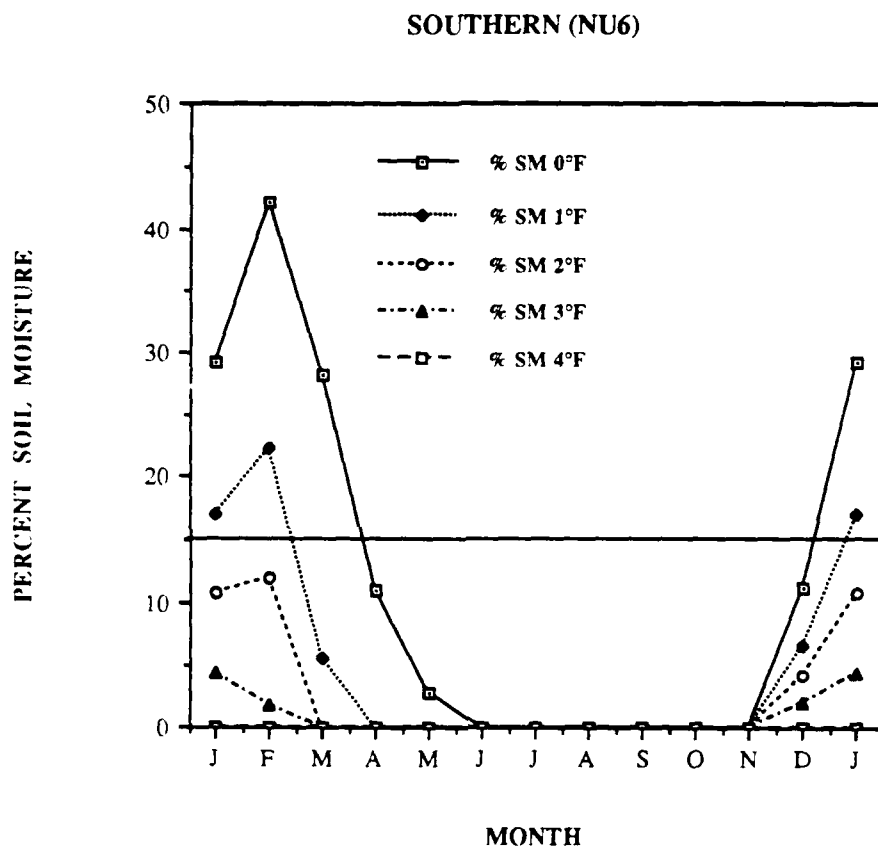


Figure 63. Percentage of monthly soil moisture (SM) for Southern Texas for a 0°F (control), 1°F, 2°F, 3°F, and 4°F increase in the mean annual temperature of Texas. Mean monthly temperatures increase non-uniformly through the year. Field capacity occurs when precipitation minus evaporation (P-E) is 6 inches or greater. Results are significant at the 95% confidence interval.

June, during which soil moisture typically falls to near 0% and remains low through early autumn. As temperatures increase 1°F, the soil moisture profile is reduced 20% (uniform temperature rise) to 40% (non-uniform temperature rise) in all months where soil moisture was above 15% available soil moisture in the control regime. Similar reductions are observed as temperatures increase 2°F and 3°F within the model. For a 4°F rise in temperature, very little moisture is present within the soil the entire year.

Table 13. Same as Table 7, except for Southern Division.

Scenario	0°F	1°F	2°F	3°F	4°F
U4	19	14	9	5	0
U6	15	10	0	0	0
NU4	19	12	5	0	0
NU6	15	6	0	0	0

8. Division Summary

Table 14 summarizes Tables 7-13 for each climatic division for the NU6 scenario. The decrease in the approximate number of weeks above 15% available soil moisture across the state for a 1°F and 2°F non-uniform rise in temperature is shown in Figures 64 and 65, respectively. Figure 64 shows that the more significant decreases occur in the western two-thirds of the state, probably because of the relatively drier conditions which prevail as a result of fewer days with warm, moist air advection from the Gulf of Mexico and because of strong subsidence induced by the subtropical high. The South

Central and Southern Divisions may experience a decrease of at least nine weeks above permanent wilting for just a 1°F rise in mean temperature. Extreme eastern and southeastern regions of the state may experience no change in the number of weeks above the lower base level if temperatures rise 1°F. This is probably due to the proximity of these regions to the Gulf of Mexico. Eastern and southeastern portions of Texas typically experience strong warm and moist air advection which tends to oppose large-scale subsidence induced by the subtropical high. The copious amounts of precipitation which falls in these regions exceed evapotranspiration rates, even if temperatures increase 1°F in the model. Figure 65 shows similar results when mean temperatures are assumed to increase by 2°F. The most significant decreases are again located in the south central and southern portions of the state whereas no change in the number of weeks above permanent wilting occurs in coastal regions.

Table 14. Approximate number of weeks above 15% available soil moisture (lower base level) for each climatic division for a 1°F non-uniform rise in temperature (between 1°F and 4°F) while assuming field capacity is equal to 6 inches of net soil water (NU6).

Climatic Division	0°F	1°F	2°F	3°F	4°F
High Plains	6	0	0	0	0
North Central	24	22	17	9	3
East Texas	52	52	44	41	38
Edwards Plateau	6	0	0	0	0
South Central	38	27	16	9	0
Upper Coast	52	52	52	46	43
Southern	15	6	0	0	0

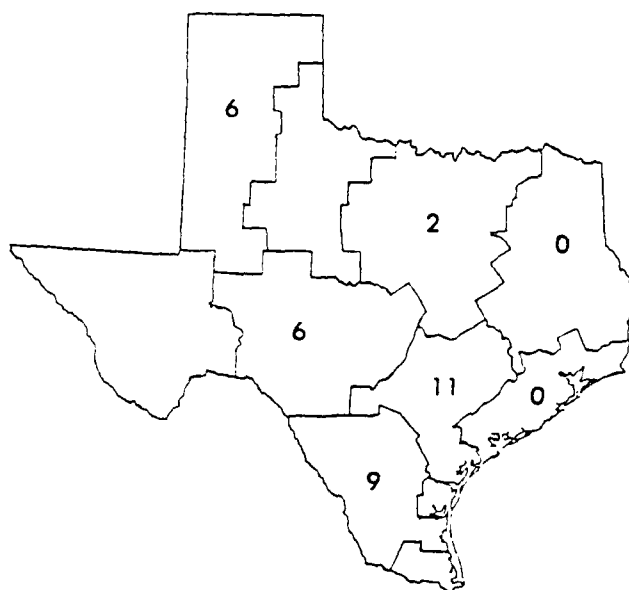


Figure 64. The decrease in the number of weeks above 15% available soil moisture (lower base level) across Texas for a 1°F non-uniform rise in temperature. Field capacity is assumed equal to 6 inches of net soil water.

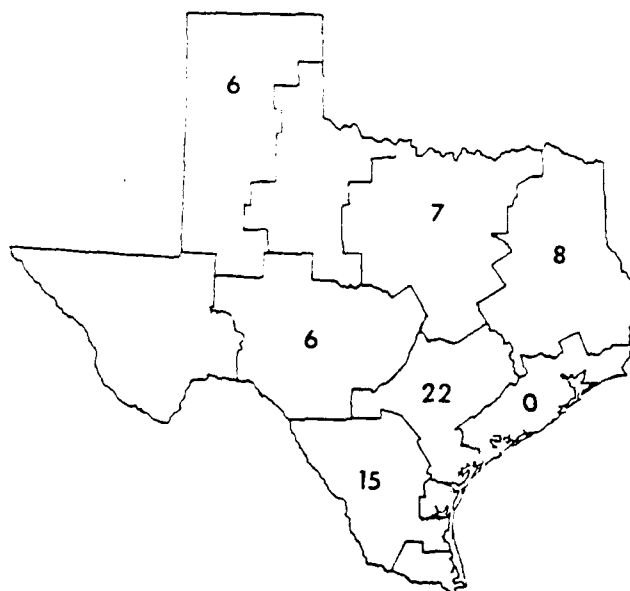


Figure 65. The decrease in the number of weeks above 15% available soil moisture (lower base level) across Texas for a 2°F non-uniform rise in temperature. Field capacity is assumed equal to 6 inches of net soil water.

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The extent to which soil moisture and soil moisture patterns will be affected as a result of *any* rise in temperature, not only 'Greenhouse type', is a critical issue for the future of Texas agriculture. Although mean annual temperatures in Texas have actually declined since the late 1800s, a study of this kind remains essential due to the uncertainty of the effects of carbon dioxide and other gases on the earth's atmosphere. The need to investigate for possible relationships among regional precipitation, soil moisture patterns, and temperature is an important step toward planning Texas agriculture in the next century.

Although precipitation increases west to east across Texas, the number of months with high correlations between temperature and precipitation decreases. It appears that the linear relationship between MMP and MMT is strongest in the dry, western regions of the state and becomes less significant in the wet, eastern regions.

The relationship between MMP and MMT was highly significant in nearly all divisions between June and September, possibly because of large-scale subsidence induced by the subtropical high and/or the presence of hot and dry continental tropical air advected across southwestern portions of Texas from Mexico.

Between October and March, 13 of the 16 cases (total possible was 60) which had high correlations occurred in divisions which typically

experience less than 1.50 inches of precipitation in any given month. Furthermore, during April and May the majority of the 10 out of 20 cases which had a significant correlation were from divisions located in the southern half of the state. This suggests that the relationship between MMP and MMT between October and May works best in regions which typically experience little monthly precipitation and/or are regions where the subtropical high is the dominating circulation feature.

The slope of the regression line of MMP on MMT was found to vary across the state and through the annual cycle. In general, slopes indicate a negative relationship with temperature during all months throughout most of the state.

The most significant slope (decline in precipitation) occurs during the mid-summer months, especially in southern and southeastern regions of the state where slopes are highly negative and precipitation is usually plentiful due to the availability of moisture from the Gulf. Precipitation losses become much less significant toward the northwest as slopes become less negative and distance from the Gulf of Mexico increases.

Slopes are usually close to zero early in the year. As mean temperatures rise during the spring months, slopes become more negative with time and by summer the magnitude of the slope reaches its most negative value. Between autumn and winter, slopes approach zero and typically oscillate about the zero line, especially in divisions located in the east.

The effects of a possible warming trend on the soil moisture regime in Texas could drastically affect crop production. Growing seasons, or periods of

time during which soil moisture is normally available for plant growth, in many regions of the state may be shortened by months, even for small increases in mean annual temperature across the state. Regions which presently have adequate soil moisture to sustain crops may have insufficient soil moisture if temperatures increase in the future.

If temperature increases are on the high side of model predictions (about 8°F), the resulting soil moisture regime may be drastic. In all divisions except East Texas and the Upper Coast, the predicted soil moisture regime would drop to near or below 15% available soil moisture during all months of the year if temperatures increase only 4°F.

Central Texas may experience worsening conditions quicker than other regions of the state, particularly portions of east and extreme southeast Texas. The number of weeks above the lower base level of available soil moisture may decrease more than nine weeks in central Texas if the mean temperature increases only 1°F.

In summary, regression statistics show a negative relationship between MMP and MMT, especially during the mid-summer months. Assuming this statistical relationship holds in a future of warmer temperatures (caused by an increase in greenhouse gases or any other phenomena), regional precipitation patterns may change significantly. A decrease in regional precipitation coupled with an increase in evapotranspiration may result in a diminished soil moisture regime across the entire state. For a 4°F rise in mean temperature across the state (which is the "low end" of GCM predictions), the soil moisture regime may be drastically effected. Desert-like conditions may

result across most of Texas if temperature increases are on the high side of GCM predictions (+ 8°F).

B. Recommendations

The primary goal of this research was to predict the monthly soil moisture regime across Texas based on any possible warming trend. Results show that serious repercussions are possible for Texas agriculture in the future, especially if temperature increases are on the high side of GCM predictions. It is hoped that the results from this research will lead to more detailed studies of this kind.

The study was intended to be an immediate aid to agriculturalists in planning Texas agriculture in the next century. However, with the "Greenhouse debate" presently being reconsidered among scientists and politicians, there is time to improve the results and possibly even modify some of the parameters within the model. Thus, the following recommendations and suggestions on further research should be considered:

(1) Assume no reduction in the AET/PET rate over the range of available soil moisture from 100% to 50%. Below this limit, assume the AET/PET rate declines linearly until 0% soil moisture is reached. The ideas used by Holmes and Robertson (1963) would help to elaborate on this method.

(2) Incorporate new findings concerning average infiltration rates for certain locations within the state and apply them to the model. For example, if mean infiltration rates are estimated to be 80% for most cases

within a particular area (instead of 100% as assumed in this model) then use this number and recalculate the percent change in soil moisture.

(3) The study should be extended to include a much larger geographical area in order to test the model in regions where the climatological variables differ from those in Texas. However, such an extension would require that the work accomplished by Moe and Griffiths (1965) also be extended or an alternate method for estimating PET would have to be used.

(4) Estimate the standard error involved in the predicted soil moisture regimes obtained in the study. The standard error of the regression of MMP on MMT (which estimates the variance in this regression) should be used to approximate the error involved in calculating the soil moisture profiles. This would make the study more plausible and would provide agriculturalists with a better feel for the "range" of possible soil moisture scenarios for a particular region.

(5) Determine the soil moisture profile across Texas while considering the effects of rising temperatures on AET only (i.e., assuming effects on precipitation are negligible). This may provide a "best case" scenario of the possible effects of a warming trend on the soil moisture regime across Texas.

(6) Estimate the soil moisture regime for Texas while assuming any kind of cooling trend. Since mean annual temperatures for Texas have actually declined about 0.008°F per year over the past 100 years, this scenario does not seem unrealistic.

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APPENDIX A
MEAN TEMPERATURE AND PRECIPITATION DATA (1941-1970)
FOR THE TEN CLIMATIC DIVISIONS OF TEXAS

MONTHLY AND ANNUAL DIVISIONAL AVERAGES TEMPERATURE (°F)

TEXAS

DIVISIONS														
HIGH PLAINS	01	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		40.1	41.5	45.0	57.2	66.2	71.8	76.8	76.9	70.2	60.4	49.4	41.8	58.1
1942		36.7	39.9	47.9	58.5	65.8	71.9	78.1	75.0	67.0	58.0	51.4	40.7	57.9
1943		39.2	45.7	46.5	62.7	66.2	76.3	76.4	81.9	70.1	58.7	46.5	35.5	58.9
1944		37.0	42.9	47.0	55.3	66.8	70.5	78.2	79.2	69.9	60.6	48.4	36.9	58.2
1945		39.1	43.3	52.2	53.9	67.7	74.1	77.4	78.2	71.0	58.7	49.3	37.0	58.5
1946		36.6	43.4	51.0	63.4	64.3	75.8	80.9	79.0	69.9	60.3	47.1	43.6	59.7
1947		36.2	36.7	44.0	54.7	64.7	75.0	78.9	78.9	73.9	64.9	42.2	39.5	57.5
1948		33.5	37.5	46.1	63.0	68.3	77.3	79.4	78.2	71.5	59.6	45.4	43.1	58.4
1949		29.1	41.7	49.4	56.1	67.2	74.8	79.5	76.4	69.8	59.3	53.5	39.9	58.1
1950		41.8	46.7	48.8	58.5	67.3	76.2	75.5	75.1	68.0	65.0	47.9	40.3	59.3
1951		37.5	43.0	47.4	56.0	66.8	74.9	81.3	80.0	71.3	61.3	44.1	40.9	58.7
1952		43.7	44.6	46.6	56.5	67.1	80.6	78.6	82.0	70.4	58.4	44.6	38.4	59.3
1953		46.2	41.9	54.2	57.0	66.8	82.9	80.6	77.8	72.8	61.2	48.5	37.7	60.6
1954		40.8	49.6	47.3	63.1	62.9	77.1	82.3	79.6	74.9	61.9	50.6	43.0	61.1
1955		38.6	39.4	49.6	60.3	67.7	74.2	78.7	78.5	72.1	61.4	46.7	43.1	59.2
1956		40.1	38.1	46.7	57.1	71.5	79.5	78.9	78.5	75.9	65.9	45.7	43.5	60.3
1957		36.5	48.4	48.5	55.2	63.0	74.0	81.0	78.9	68.7	57.9	43.2	44.5	58.6
1958		37.5	39.9	40.3	54.2	68.2	77.7	79.6	79.4	71.9	59.2	48.9	39.5	58.0
1959		35.9	41.2	48.0	57.0	68.5	76.6	76.8	79.2	72.3	56.8	43.4	42.0	58.1
1960		35.6	35.6	44.7	61.2	67.2	77.2	77.1	77.9	71.8	61.0	43.3	36.5	57.9
1961		36.0	41.9	48.9	57.7	68.3	74.4	76.0	78.0	68.9	60.6	43.5	38.5	57.6
1962		33.7	47.3	46.7	59.0	72.7	73.7	78.7	78.8	70.8	62.4	50.0	42.2	59.7
1963		31.7	43.4	51.7	63.4	70.2	75.0	81.0	78.7	72.8	66.0	50.3	35.0	59.9
1964		38.9	35.1	46.9	59.8	70.1	75.8	81.7	79.4	70.1	60.7	48.6	40.1	58.9
1965		42.5	39.0	40.5	61.5	68.2	74.0	76.7	76.8	70.1	60.0	54.0	44.2	59.2
1966		31.8	36.9	51.4	56.9	66.6	75.2	82.6	74.5	69.4	57.8	51.9	37.2	57.7
1967		40.5	41.5	54.8	62.8	64.9	74.8	77.1	75.1	68.2	61.0	47.9	36.6	58.8
1968		38.7	39.1	48.7	55.8	66.3	75.0	76.8	74.5	68.8	61.9	46.1	38.2	57.5
1969		42.0	41.8	39.8	59.5	66.8	73.4	81.8	79.7	70.3	59.3	47.1	41.4	58.2
1970		35.3	43.8	43.5	56.1	67.9	74.3	79.6	78.8	70.0	55.1	46.6	44.0	57.9
NORMA		37.8	41.7	47.6	56.5	67.1	75.8	79.2	78.2	70.7	60.3	47.7	40.2	58.7
LOW ROLLING PLAINS 02		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		45.3	46.9	48.8	62.1	71.1	75.6	80.8	81.0	74.6	65.6	53.2	46.8	62.5
1942		40.5	46.1	53.3	63.6	70.7	76.7	82.2	81.2	71.8	62.9	50.4	46.6	62.7
1943		43.0	50.1	49.6	67.0	69.5	80.5	84.4	87.8	74.6	62.6	51.9	40.6	63.5
1944		43.0	47.9	51.8	61.4	71.2	81.3	83.4	83.7	73.8	64.7	54.2	41.3	63.1
1945		43.1	47.0	57.5	59.6	72.0	79.3	80.2	82.2	76.1	62.7	56.6	42.3	63.3
1946		41.8	49.5	58.3	68.7	70.4	79.6	85.5	84.5	74.1	66.6	53.2	48.3	65.0
1947		40.8	41.1	48.6	62.0	70.6	81.4	83.8	84.7	78.7	71.2	68.8	45.8	63.1
1948		38.5	42.1	49.8	69.2	72.9	81.8	83.3	89.1	75.5	65.5	50.9	47.4	63.4
1949		33.6	46.7	52.9	59.7	71.7	79.7	84.2	80.5	73.2	63.5	50.5	46.2	62.2
1950		45.0	50.5	53.4	63.1	71.2	79.2	79.9	79.1	73.2	69.6	52.2	43.1	63.3
1951		43.3	48.0	53.4	62.7	72.5	79.4	85.6	86.3	76.8	67.1	48.8	46.0	64.2
1952		49.1	50.6	52.9	62.0	72.1	84.7	83.8	89.1	75.0	62.5	51.1	43.7	64.8
1953		49.8	47.3	56.3	62.3	72.0	88.1	84.0	81.8	77.4	65.7	51.4	43.1	65.2
1954		44.2	54.6	52.4	68.8	67.1	81.2	86.4	80.3	67.4	54.9	47.5	40.0	66.0
1955		43.3	45.4	55.7	66.0	74.1	78.5	83.6	83.3	77.7	68.5	51.4	45.1	64.3
1956		42.3	44.9	55.8	63.0	70.1	83.0	85.7	84.0	78.7	68.6	50.5	46.0	65.2
1957		41.9	51.0	52.3	60.6	68.0	77.3	85.7	83.9	73.3	61.4	47.8	47.8	62.6
1958		42.4	42.1	45.4	54.6	71.5	81.7	83.8	84.1	75.9	63.5	53.5	42.3	62.7
1959		39.9	45.4	53.9	63.1	73.9	79.1	79.8	83.1	77.6	61.9	46.7	46.9	62.6
1960		41.2	40.9	46.8	66.0	70.9	81.6	82.3	82.2	76.9	66.4	53.1	40.2	62.6
1961		39.4	45.9	55.5	63.1	71.6	76.5	76.7	78.8	73.6	64.4	48.8	42.8	61.9
1962		37.4	41.9	51.6	62.8	71.0	77.3	83.0	84.1	74.3	67.7	53.6	45.5	63.9
1963		36.5	40.1	51.4	69.3	74.1	79.5	85.6	84.1	77.4	71.2	51.1	38.9	64.6
1964		43.8	42.1	53.4	66.6	74.4	79.8	86.3	84.6	74.4	63.8	54.3	44.5	64.0
1965		40.4	44.1	45.0	67.1	72.2	78.5	84.8	81.7	76.4	63.8	58.5	49.1	64.0
1966		36.4	41.1	50.6	61.0	70.6	79.4	86.3	78.9	72.3	61.4	57.1	41.6	62.1
1967		45.1	45.9	60.7	68.7	70.4	80.1	84.2	80.2	71.3	61.9	52.5	41.8	63.7
1968		41.9	41.7	52.2	60.3	69.7	77.7	80.5	80.5	72.6	64.4	50.6	40.9	61.9
1969		45.0	46.1	44.8	64.1	69.7	78.6	86.9	83.9	73.8	59.9	51.8	45.9	62.6
1970		38.7	47.4	48.4	62.5	70.6	78.7	84.2	83.3	75.7	60.9	50.5	49.3	62.5
NORMA		42.1	46.1	52.6	64.0	71.6	80.0	83.6	83.2	75.3	64.9	52.6	44.6	63.4
NORTH CENTRAL 03		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		48.1	46.3	51.2	64.5	73.8	77.5	83.3	83.3	78.4	70.4	54.4	49.3	65.1
1942		42.2	47.7	55.5	64.8	70.8	79.8	82.7	83.5	73.6	64.9	58.5	47.8	64.3
1943		44.8	52.3	50.8	68.3	72.7	81.5	85.2	88.0	75.9	65.0	54.6	44.2	65.3
1944		45.4	51.3	54.5	64.1	71.3	81.6	84.4	84.6	75.8	67.3	57.0	43.4	65.1
1945		45.3	49.2	61.0	62.7	74.0	78.9	80.9	82.7	77.8	64.6	54.4	44.2	64.8
1946		44.8	51.0	60.2	68.1	70.6	78.2	84.8	84.5	75.1	68.3	55.9	51.7	66.1
1947		44.3	43.7	50.5	64.6	71.3	81.1	84.1	85.3	79.2	73.4	51.0	48.1	64.8
1948		39.4	45.6	53.0	70.3	73.9	82.4	84.5	85.3	77.0	65.8	55.0	50.5	65.0
1949		39.4	46.1	55.7	62.3	74.4	80.3	84.6	84.0	75.4	64.8	58.5	49.5	64.7
1950		49.2	52.4	55.1	63.7	72.9	79.1	80.8	81.6	75.2	71.3	54.9	46.8	65.3
1951		46.1	48.6	56.8	64.4	72.4	80.0	85.9	88.7	78.9	69.4	51.8	49.6	66.1
1952		53.7	53.9	54.8	62.0	71.7	83.0	84.6	85.1	77.9	69.5	54.5	45.5	66.2
1953		51.2	49.5	60.9	62.2	72.0	86.3	84.1	89.1	78.0	68.8	53.5	45.2	66.2
1954		46.2	56.0	55.2	70.2	68.6	82.5	89.1	87.2	81.6	69.6	55.2	49.6	67.8
1955		45.6	47.6	57.4	66.2	75.7	77.6	84.1	82.3	80.0	67.7	54.6	46.0	65.9
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MONTHLY AND ANNUAL DIVISIONAL AVERAGES TEMPERATURE (°F)

DIVISIONS		TEXAS												
EAST TEXAS	04	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		50.7	48.0	53.1	66.8	74.1	79.0	82.5	83.4	79.2	73.1	59.0	51.6	66.3
1942		45.4	48.0	57.2	66.4	72.3	80.0	81.0	82.4	74.0	67.7	61.0	51.5	65.7
1943		49.1	54.8	54.0	68.0	75.2	81.7	83.1	84.1	75.4	65.7	54.5	47.7	66.2
1944		48.1	50.7	58.4	65.9	72.0	81.3	83.9	83.8	76.9	67.8	58.2	46.1	66.0
1945		47.2	53.5	64.0	66.0	71.0	79.6	81.0	81.9	78.0	65.4	61.2	46.9	66.3
1946		48.1	53.2	62.0	69.0	71.7	77.6	82.2	82.7	76.1	69.0	58.8	36.6	67.1
1947		47.7	44.9	52.4	67.3	72.1	78.8	81.4	84.0	78.8	71.9	54.1	50.3	65.4
1948		41.3	49.9	57.4	69.9	73.4	81.3	84.2	84.8	77.2	66.8	36.8	35.7	66.4
1949		47.1	53.7	58.2	63.6	76.0	80.7	82.8	80.2	76.5	68.2	58.5	52.5	66.5
1950		56.3	55.7	56.7	63.8	74.8	78.7	80.8	81.7	75.5	70.7	56.4	49.4	66.7
1951		49.0	51.2	59.6	64.2	72.6	80.4	84.3	87.2	77.9	69.2	54.0	53.0	66.9
1952		57.7	55.4	56.8	62.7	71.8	81.4	82.4	85.0	77.1	62.2	55.9	48.3	66.4
1953		52.0	50.9	63.6	63.9	75.8	83.8	81.7	81.8	77.1	69.3	54.4	48.6	66.6
1954		50.0	57.1	56.8	69.8	69.2	80.9	86.4	85.6	80.6	70.0	55.1	51.0	67.7
1955		48.0	50.2	60.6	68.9	75.2	77.1	82.4	81.0	78.4	67.0	56.5	49.8	66.3
1956		47.8	53.2	57.3	64.2	75.8	79.6	84.8	84.0	78.2	70.4	54.5	54.1	67.0
1957		48.7	57.7	58.7	65.2	73.8	79.0	84.1	81.9	74.6	63.6	56.0	53.0	66.4
1958		45.6	45.3	52.9	64.4	73.3	80.7	83.3	82.6	77.4	66.0	58.1	46.1	66.0
1959		44.6	50.8	55.8	62.9	75.3	79.0	81.1	81.6	77.9	67.5	51.4	51.0	66.9
1960		46.2	44.6	50.4	67.8	71.3	80.2	82.7	81.8	77.5	69.7	58.3	45.6	64.7
1961		43.1	52.9	61.0	62.8	72.2	78.4	80.3	79.6	76.5	66.4	54.9	48.6	66.6
1962		42.0	57.7	54.0	64.1	74.8	78.7	83.3	84.9	77.8	71.0	55.4	48.3	66.0
1963		40.3	47.3	61.5	70.1	74.4	80.9	83.5	84.2	78.1	72.0	59.1	41.4	66.1
1964		46.5	45.7	56.7	68.2	74.4	79.2	83.9	83.8	77.1	60.1	49.1	49.9	65.8
1965		50.4	48.3	51.1	69.7	73.7	78.7	83.0	81.6	77.8	65.3	63.5	51.9	66.3
1966		43.1	47.3	56.9	66.3	72.1	77.7	84.0	84.3	80.8	64.7	48.8	47.8	64.6
1967		48.0	47.4	62.8	71.2	71.0	80.0	80.3	80.4	73.4	65.7	56.9	48.1	65.6
1968		45.8	45.1	55.2	66.1	72.1	78.0	79.9	81.7	73.4	67.1	54.1	47.9	63.9
1969		49.8	50.1	50.8	66.0	71.8	79.1	85.5	83.4	77.0	67.8	55.4	50.3	65.6
1970		42.2	49.5	54.2	67.3	71.5	78.1	81.5	83.3	78.4	64.2	53.7	55.5	65.0
NORMAL		47.4	50.9	57.0	66.4	73.1	79.6	82.7	82.8	77.0	67.6	56.7	49.8	65.9

TRANS. REGS.	05	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		46.6	50.4	51.7	62.0	71.1	74.9	77.9	78.1	73.0	66.1	53.6	47.8	62.8
1942		45.1	48.5	54.2	64.0	72.2	79.9	80.4	77.9	71.0	64.2	57.8	50.6	63.8
1943		47.4	53.6	57.2	69.0	73.0	79.2	80.3	83.5	72.5	63.4	52.1	44.3	64.7
1944		44.5	52.5	55.5	63.0	71.8	80.8	81.9	79.3	71.2	64.7	53.2	43.2	63.5
1945		48.1	53.1	58.6	62.4	73.7	78.7	77.9	78.9	74.0	62.4	55.8	46.5	64.2
1946		42.0	45.5	57.0	67.9	71.1	79.1	80.9	81.5	75.5	66.8	51.0	48.0	64.3
1947		47.1	47.1	54.6	63.0	72.9	80.3	82.2	78.4	74.4	68.6	51.7	55.4	63.1
1948		42.4	50.6	54.4	69.6	74.0	81.3	80.1	80.0	72.7	63.0	49.8	50.2	64.1
1949		38.0	49.6	58.2	60.0	73.1	79.1	79.1	76.3	72.8	61.7	55.8	46.0	62.5
1950		51.2	53.0	57.3	65.0	71.3	78.8	77.7	77.6	72.9	68.5	54.1	48.7	64.7
1951		44.5	49.0	54.9	62.1	72.5	80.1	82.5	81.2	75.1	67.7	52.1	49.3	64.3
1952		51.6	50.1	53.7	63.4	71.5	81.0	78.7	82.9	73.9	63.8	51.3	44.8	63.9
1953		50.6	48.7	59.2	64.4	70.3	82.6	82.2	80.2	74.9	64.3	52.1	40.9	64.2
1954		48.5	53.7	59.5	68.2	71.5	79.8	81.8	79.5	77.1	66.8	53.7	47.1	65.4
1955		42.8	47.5	56.9	65.7	72.5	78.9	79.2	78.8	74.9	65.2	53.5	49.2	63.7
1956		48.2	46.8	56.6	62.4	75.8	82.2	81.3	79.6	74.9	67.4	50.3	46.5	64.3
1957		49.9	57.5	62.6	62.6	69.8	79.3	82.9	81.1	73.4	62.1	49.2	48.9	64.9
1958		43.0	49.6	51.3	63.4	72.8	82.0	83.1	80.8	73.8	61.4	53.8	46.3	63.4
1959		46.5	49.1	53.6	63.0	72.8	79.7	78.5	78.8	75.5	64.8	49.7	46.3	63.4
1960		43.9	45.0	55.3	65.3	71.0	81.7	78.8	78.7	76.7	65.8	54.3	40.8	62.9
1961		41.7	48.5	56.5	64.2	73.0	77.8	79.6	79.1	74.5	65.2	49.0	47.7	63.1
1962		42.0	55.7	53.0	67.5	76.4	79.8	81.5	82.4	75.2	67.1	54.5	46.3	65.1
1963		41.7	48.8	57.6	67.9	74.2	79.7	82.5	79.8	74.7	66.3	54.1	42.6	64.2
1964		41.9	43.3	54.4	64.8	73.9	79.0	82.6	81.7	74.5	63.4	54.7	46.4	63.4
1965		48.4	45.9	51.4	66.8	72.4	78.6	81.8	78.6	74.5	63.3	53.8	48.9	63.1
1966		40.9	43.7	57.3	64.3	72.4	78.5	83.4	77.9	73.8	61.5	56.6	44.2	62.6
1967		44.4	46.2	61.2	69.0	71.0	79.9	81.2	77.7	71.6	64.2	55.0	42.1	64.0
1968		45.1	48.0	53.2	62.4	72.8	79.7	78.2	78.1	71.3	60.1	51.8	44.6	62.7
1969		49.6	47.7	49.8	60.2	71.7	79.9	83.3	83.0	75.2	64.4	51.6	48.2	64.4
1970		44.6	49.2	52.4	64.2	70.7	77.2	80.8	79.9	73.2	58.9	52.0	50.7	62.8
NORMAL		45.2	49.6	55.5	64.8	72.5	79.7	80.8	79.7	73.8	64.6	53.0	46.5	63.8

EDWARDS PLATEAU	06	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		52.1	51.1	53.9	65.9	74.1	78.3	81.9	83.5	78.5	71.9	56.5	51.1	66.6
1942		46.0	50.2	57.2	66.4	73.0	80.9	81.0	81.6	73.3	66.4	60.7	52.2	65.7
1943		48.2	56.1	56.3	69.8	74.9	80.0	82.7	85.8	74.9	65.2	55.5	48.0	66.5
1944		47.6	54.0	58.1	66.5	71.1	80.1	84.2	83.1	75.6	64.8	58.1	46.5	66.0
1945		46.5	53.5	64.0	65.0	73.8	80.1	82.1	83.2	78.7	65.9	60.6	48.5	67.1
1946		46.8	53.1	61.7	69.8	73.0	78.8	83.3	83.1	76.9	69.6	57.1	52.6	67.2
1947		46.7	46.1	54.5	65.7	73.8	81.2	83.1	81.8	77.8	79.9	54.1	50.0	65.6
1948		42.2	49.7	56.8	70.3	75.9	82.4	82.4	83.3	74.8	66.1	44.8	52.6	65.9
1949		42.2	53.5	58.2	61.8	74.0	79.2	82.2	79.6	76.3	65.6	58.4	51.1	65.2
1950		54.1	54.8	58.3	65.7	74.7	79.0	82.2	81.5	77.0	71.1	56.6	49.1	67.0
1951		47.4	50.9	59.6	66.1	74.1	80.8	85.5	85.7	79.1	71.3	54.8	52.4	67.3
1952		55.8	55.9	57.2	64.0	71.8	81.0	82.4	86.4	75.5	63.7	55.4	48.3	66.5
1953		53.6	52.0	64.2	66.8	74.0	83.6	85.1	82.8	76.3	67.0	53.2	45.6	67.4
1954		50.8	57.1	58.4	71.3	72.3	81.3	84.4	84.0	80.0	69.4	58.2	55.3	68.3
1955		48.2	51.2	60.5	71.5	76.0	79.5	82.3	81.4	78.6	67.2	55.7	50.1	66.0
1956		48.0	51.9	60.7	66.8	77.0	83.4	84.0	83.6	77.8	70.3	54.2	51.6	67.4
1957		49.6	59.0	53.3	63.9	70.9	78.6	84.5	84.2	73.4	63.9	52.7	51.5	65.6
1958		44.0	47.0	51.7	64.4	72.4	81.2	83.9	83.1	77.1	64.8	57.0	46.6	64.6
1959		45.8	50.4	57.3	63.1	74.6	80.0	80.1	81.7	79.0	68.7	50.1	50.4	64.9
1960		47.5	48.1	53.4	67.7	72.6	82.3	82.9	81.6	76.7	70.3	58.1	45.2	65.4
1961		42.7	51.9	60.7	64.2	75.4	78.4	79.5	78.6	76.4	67.1	52.9	45.1	65.1
1962		42.3	58.2	55.2	66.3	76.2	79.5	84.6	85.1	78.4	71.6	56.4	48.3	66.8
1963		41.8	49.4	61.9	71.9	75.0	80.8	84.2	84.0	77.7	70.6	57.7	41.6	66.4
1964		45.7	45.4	58.1	68.3	73.8	80.6	84.8	84.4	76.8	69.9	58.3	46.4	65.9
1965		50.8	46.5	52.0	69.6	72.7	79.1	83.2	81.9	78.5	65.0	61.7	51.9	66.1
1966		42.3	46.2	57.9	68.7	72.5	78.7							

MONTHLY AND ANNUAL DIVISIONAL AVERAGES TEMPERATURE (°F)

TEXAS

DIVISIONS															
SOUTH CENTRAL		0°	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941	56.1	53.0	56.7	68.6	75.6	80.2	83.4	84.0	81.5	76.1	58.7	55.8	69.1		
1942	50.3	54.5	61.8	69.3	76.1	82.8	81.6	83.2	78.9	71.5	64.8	57.0	69.2		
1943	52.6	60.4	59.5	72.6	78.1	81.3	84.1	85.7	77.8	68.0	59.0	52.0	69.4		
1944	51.8	60.3	62.4	69.6	73.2	81.8	83.2	85.2	78.9	70.2	61.8	51.4	69.3		
1945	53.6	58.0	68.8	68.8	73.4	82.4	84.3	84.7	80.3	69.6	60.2	53.1	70.4		
1946	51.2	57.3	64.5	71.8	76.6	79.6	84.3	84.0	79.1	72.9	62.0	57.6	70.1		
1947	50.4	50.1	57.7	69.2	75.5	82.9	84.4	83.6	80.9	71.1	59.5	54.9	68.9		
1948	47.6	58.7	61.7	72.6	77.9	83.9	85.3	85.9	78.7	71.5	61.4	59.6	70.1		
1949	49.8	58.4	63.3	66.2	74.6	81.4	84.0	82.8	80.9	71.8	63.2	58.2	70.0		
1950	60.7	59.8	61.9	68.5	78.4	81.4	84.2	84.1	80.1	74.8	62.1	56.0	71.0		
1951	54.0	56.1	64.6	69.5	76.6	82.8	86.5	87.4	81.0	74.2	59.5	57.6	70.8		
1952	61.4	60.2	62.1	66.8	74.4	81.9	83.8	86.3	78.5	66.3	60.3	53.2	69.6		
1953	57.6	55.6	69.0	69.7	76.6	85.2	85.9	84.5	78.8	71.9	60.2	51.1	70.5		
1954	55.9	61.6	62.7	73.2	74.4	82.2	86.4	86.3	82.8	73.9	61.0	58.4	71.4		
1955	54.3	56.6	64.9	73.6	78.8	80.8	84.5	84.5	81.5	71.4	61.9	55.0	70.6		
1956	53.7	59.2	63.6	70.1	78.6	83.5	85.6	85.2	80.9	74.4	59.8	58.0	71.1		
1957	55.4	63.3	55.5	68.4	75.8	81.0	85.6	85.5	78.0	68.1	59.1	57.7	69.5		
1958	51.0	51.9	57.6	69.3	76.0	83.4	85.0	85.8	80.4	69.3	62.4	51.7	68.7		
1959	50.4	55.5	61.2	66.5	77.8	82.1	83.6	83.5	81.2	71.7	56.2	55.8	68.6		
1960	52.3	51.3	57.3	70.8	74.2	83.0	84.3	83.4	78.7	73.7	63.7	51.7	68.7		
1961	48.8	57.1	65.9	68.4	77.4	80.9	82.1	81.8	79.7	70.9	56.7	55.6	69.0		
1962	47.4	64.4	60.1	69.3	77.2	81.3	85.4	87.1	81.3	76.1	61.5	53.6	70.4		
1963	46.7	53.8	66.1	75.0	78.4	83.4	84.9	85.9	81.2	74.8	64.1	47.2	70.1		
1964	52.7	50.9	61.6	71.7	77.9	81.5	85.1	85.9	80.8	68.5	65.4	55.0	69.0		
1965	56.8	53.1	57.2	72.6	76.1	81.3	84.1	83.6	81.3	68.2	67.6	57.9	70.8		
1966	47.7	51.4	61.8	70.5	74.7	79.7	83.8	84.3	78.0	69.5	65.5	54.1	68.4		
1967	53.7	54.2	61.6	76.3	76.7	83.0	84.3	82.0	76.4	69.4	62.8	53.4	69.9		
1968	50.3	50.2	58.9	69.6	75.0	76.7	81.9	83.6	77.1	73.1	59.7	54.3	67.8		
1969	55.2	56.4	56.2	69.9	74.0	81.2	86.5	85.3	79.8	71.2	60.0	56.9	69.4		
1970	47.2	55.7	58.1	70.7	72.6	76.5	83.0	84.5	79.4	68.5	59.1	61.9	68.4		
NORMA	52.5	50.2	61.7	70.3	76.3	81.9	84.4	84.6	79.8	71.7	61.6	55.2	65.7		
UPPER COAST		0°	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941	56.5	52.8	56.7	69.3	75.6	80.8	82.7	83.4	80.1	76.1	58.8	57.1	69.2		
1942	50.8	53.6	60.4	68.0	75.6	81.6	81.4	81.7	76.9	72.2	64.9	57.7	68.8		
1943	53.3	59.8	55.8	71.4	77.7	82.1	83.8	83.6	77.0	64.1	59.2	53.7	69.1		
1944	51.4	61.8	62.4	69.7	73.4	82.2	84.0	84.2	79.5	70.0	62.8	52.4	69.5		
1945	53.8	56.7	68.7	69.6	74.4	81.2	83.0	82.8	76.8	69.1	60.2	53.2	70.2		
1946	51.4	57.3	64.5	71.8	76.6	79.6	84.3	84.0	79.1	72.9	62.0	57.6	70.1		
1947	50.4	44.9	56.9	69.7	75.7	81.8	82.9	82.6	79.9	76.1	60.2	50.1	68.7		
1948	47.5	55.2	61.7	71.6	77.0	82.3	84.4	84.5	77.9	70.6	61.8	54.4	69.3		
1949	52.8	56.1	62.9	66.5	78.2	82.4	83.3	82.1	80.4	72.7	62.9	58.0	70.1		
1950	63.1	61.1	61.2	68.1	78.3	81.0	82.7	83.1	80.0	74.0	61.8	56.1	70.4		
1951	57.4	63.7	63.3	67.6	75.6	82.0	84.6	84.1	80.0	73.3	59.6	58.7	70.1		
1952	62.3	56.6	60.4	69.9	74.0	81.5	83.1	84.3	78.4	65.8	60.1	53.9	69.1		
1953	57.0	55.6	68.0	69.5	76.8	83.8	83.9	82.5	79.0	72.1	60.2	51.8	70.0		
1954	56.3	60.7	60.6	72.0	72.9	81.8	84.8	84.7	81.8	73.5	60.6	58.0	70.6		
1955	54.0	50.4	64.5	71.4	77.6	79.6	83.3	83.0	80.6	71.1	61.8	56.3	70.1		
1956	53.4	54.0	62.4	68.4	77.7	81.1	83.9	83.6	80.4	76.1	60.7	59.5	70.4		
1957	57.4	65.7	61.8	68.8	76.6	80.0	84.0	84.0	77.6	68.1	61.4	57.7	70.1		
1958	50.7	51.1	58.2	69.5	76.1	83.6	84.9	84.6	80.3	70.3	63.6	52.7	68.4		
1959	50.3	55.7	60.7	66.6	77.3	82.1	82.5	82.5	80.3	72.2	57.1	55.4	68.5		
1960	52.3	50.7	62.7	66.6	77.3	82.0	84.4	81.4	78.8	73.4	64.2	52.5	68.5		
1961	46.7	50.9	65.4	66.7	75.6	79.7	81.1	81.1	79.2	71.1	60.6	56.6	68.5		
1962	48.7	63.4	59.2	68.5	76.2	80.8	84.4	85.7	81.4	75.3	61.2	54.4	69.4		
1963	47.0	51.5	63.0	71.0	77.5	82.1	83.5	84.5	80.5	74.9	64.6	47.8	69.1		
1964	54.7	50.6	61.7	70.4	77.5	81.1	83.3	83.3	79.8	68.1	65.4	55.1	69.1		
1965	56.4	53.8	57.9	72.4	76.8	81.7	83.6	82.6	80.7	69.0	60.5	58.2	70.1		
1966	46.4	52.1	60.7	69.7	75.2	79.7	83.8	82.0	76.8	69.2	64.9	54.1	68.2		
1967	52.7	44.0	60.0	75.3	75.3	82.6	82.2	80.8	76.9	69.8	63.7	55.3	69.5		
1968	51.6	50.2	58.4	70.3	75.8	79.8	81.8	83.3	77.3	72.7	59.9	54.3	68.0		
1969	55.2	56.4	55.7	69.7	74.3	80.7	85.3	84.4	76.6	72.5	60.8	57.4	69.3		
1970	46.1	55.1	58.3	70.2	72.9	76.4	82.4	84.1	79.8	68.6	58.8	61.7	68.3		
NORMA	53.1	51.1	61.3	64.7	75.9	81.3	83.4	83.4	79.4	71.6	62.0	55.8	69.4		
SOUTHERN		0°	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941	57.1	55.8	58.4	71.6	76.9	82.1	85.6	87.1	83.3	78.6	62.4	57.5	71.4		
1942	53.1	56.3	64.1	72.7	78.2	85.4	83.6	84.9	77.7	73.4	65.6	58.3	71.1		
1943	53.3	61.1	63.6	75.4	81.0	83.3	86.7	86.1	76.8	69.7	60.3	52.5	71.3		
1944	52.7	61.5	65.1	72.7	76.8	84.2	87.8	86.4	80.4	72.2	63.7	52.3	71.3		
1945	55.1	59.3	70.3	71.7	78.9	86.3	87.5	87.4	82.5	70.7	66.7	54.0	72.5		
1946	52.3	59.4	68.4	75.6	80.1	82.3	87.5	86.5	82.5	75.8	64.0	58.7	72.6		
1947	51.3	51.4	61.3	73.0	79.2	85.4	87.2	83.7	82.7	74.1	61.8	56.9	71.2		
1948	50.6	57.7	64.7	76.0	81.9	86.8	87.2	88.0	79.8	72.0	61.2	60.4	72.1		
1949	51.5	60.6	68.4	67.7	80.3	84.0	85.4	84.7	83.0	73.0	64.7	59.7	71.8		
1950	62.9	62.7	65.9	73.6	81.4	83.6	86.6	86.2	83.4	76.9	64.1	56.5	73.8		
1951	55.3	58.4	67.0	73.5	78.8	85.5	89.4	88.3	83.0	75.9	61.5	59.3	73.0		
1952	62.7	61.7	63.6	71.2	77.8	83.7	86.4	88.7	81.3	69.6	62.4	54.8	72.2		
1953	59.6	58.9	72.7	75.9	81.3	89.0	89.4	86.2	79.7	72.0	61.2	51.3	73.1		
1954	57.8	63.8	66.0	76.0	77.8	83.1	86.7	87.4	86.2	78.1	62.2	59.5	73.8		
1955	55.0	59.1	68.1	77.0	82.2	86.7	86.7	87.3	82.32.						

MONTHLY AND ANNUAL DIVISIONAL AVERAGES TEMPERATURE (°F)

DIVISIONS														TEXAS	
LODEF	VALLEY	IC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941			63.7	60.0	62.6	73.8	78.1	82.2	84.5	85.0	83.7	79.8	66.7	62.1	73.5
1942			56.5	60.4	66.8	74.9	79.7	83.3	83.4	84.0	80.4	77.5	70.3	65.0	73.5
1943			57.5	60.8	67.6	75.8	81.1	83.6	86.8	86.7	80.8	73.1	65.4	59.6	73.7
1944			58.8	67.7	70.0	74.8	79.0	83.2	85.5	85.4	81.0	74.3	67.9	59.4	73.9
1945			61.9	65.8	75.5	76.4	79.9	85.7	86.3	85.4	82.0	74.3	73.4	59.9	75.5
1946			57.9	64.5	70.8	76.5	82.8	82.3	86.7	85.9	83.9	78.2	69.2	63.4	75.2
1947			56.4	56.7	65.0	75.5	80.7	85.8	86.7	82.9	83.0	79.7	68.1	61.2	73.5
1948			55.2	62.8	67.2	76.1	80.9	84.2	85.2	85.7	79.9	74.1	67.0	67.1	73.8
1949			57.7	64.5	70.0	72.7	81.6	84.6	85.6	85.3	83.3	77.2	68.2	66.7	74.8
1950			69.5	69.2	68.4	76.5	82.7	83.6	85.6	85.3	84.4	78.1	67.6	62.6	76.1
1951			62.0	62.0	68.9	74.6	78.7	84.0	85.1	85.1	82.2	77.1	65.9	65.8	74.4
1952			67.9	67.4	70.9	75.8	78.0	81.8	83.6	86.2	81.2	71.2	66.5	60.3	74.1
1953			63.5	63.7	75.7	77.9	81.4	86.6	86.7	85.2	81.2	75.2	66.5	58.1	75.1
1954			64.8	67.5	68.7	76.8	78.4	83.5	84.8	85.1	83.3	76.0	67.2	64.3	75.0
1955			61.5	60.7	71.0	77.3	82.1	82.8	83.1	84.5	81.1	74.1	66.9	62.1	73.9
1956			62.3	65.6	69.3	74.0	79.6	82.3	84.0	85.2	81.4	77.9	65.0	64.6	74.3
1957			65.6	69.9	69.7	75.0	80.6	82.7	85.6	86.0	81.6	75.1	65.9	64.1	75.2
1958			57.2	60.5	63.4	75.3	78.5	84.2	84.7	86.4	82.7	73.0	67.8	57.6	72.6
1959			55.8	60.4	64.5	71.3	80.9	81.8	84.7	85.2	84.1	76.3	61.5	61.9	72.5
1960			60.3	58.8	63.4	74.2	77.5	83.5	85.6	85.0	79.3	78.4	69.0	57.2	72.7
1961			53.8	62.1	72.1	73.3	80.6	83.1	83.8	83.2	81.1	74.5	60.1	62.7	73.0
1962			54.2	71.1	66.4	74.1	79.0	83.1	85.1	86.4	83.6	80.0	67.1	58.8	74.1
1963			54.0	59.4	70.5	74.3	79.4	83.9	83.9	85.4	82.3	75.6	68.6	52.9	72.9
1964			58.2	57.7	67.8	77.2	80.3	81.7	85.2	86.6	83.2	72.2	70.6	54.4	73.3
1965			62.8	59.7	64.0	77.2	80.1	83.6	84.7	83.3	82.8	71.6	72.5	64.4	73.9
1966			53.0	50.1	65.8	74.8	76.8	80.6	84.0	85.4	82.7	73.7	66.8	60.5	71.9
1967			57.6	60.7	71.0	79.8	79.8	83.1	84.9	82.0	78.0	72.7	66.9	60.0	73.2
1968			55.4	56.7	62.8	74.6	79.8	82.4	83.3	84.3	81.8	77.4	66.8	62.3	72.3
1969			62.0	63.6	62.4	75.8	78.6	83.6	87.1	85.4	81.7	75.9	65.4	63.2	73.7
1970			54.3	61.6	64.7	75.8	75.0	81.2	83.1	85.1	81.2	73.3	64.0	68.4	72.3
NORMA			56.4	61.8	67.9	75.5	79.8	83.3	85.0	85.1	82.0	75.6	67.5	61.9	73.8

MONTHLY AND ANNUAL DIVISIONAL AVERAGES PRECIPITATION (INCHES)

DIVISIONS														TEXAS
HIGH PLAINS	01	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		0.69	0.93	2.36	2.40	8.48	4.53	4.17	2.58	3.63	7.02	0.28	0.52	37.39
1942		0.13	0.22	0.97	3.78	1.02	3.82	1.80	3.79	3.34	4.44	0.03	1.80	25.14
1943		0.05	0.07	0.13	1.13	2.81	1.91	2.91	1.01	1.19	0.43	0.65	2.27	14.56
1944		1.43	0.87	0.28	1.53	3.10	2.29	3.36	2.25	2.74	1.38	1.01	1.86	21.90
1945		0.88	0.43	0.49	1.22	0.54	1.01	2.53	2.88	2.84	1.34	0.11	0.27	14.04
1946		0.95	0.40	0.59	0.77	1.77	1.77	1.14	2.79	2.42	4.84	1.28	0.84	19.36
1947		0.65	0.09	1.03	1.76	5.33	1.89	1.64	0.98	0.14	0.61	1.00	0.98	16.10
1948		0.40	1.74	0.66	0.56	2.39	2.21	2.24	2.60	0.94	1.05	0.91	0.12	15.92
1949		2.72	0.63	0.67	1.93	5.34	4.35	2.74	2.28	2.63	1.42	0.01	0.52	25.22
1950		0.15	0.16	0.03	0.91	2.54	3.22	6.75	3.22	4.52	0.40	0.03	0.07	22.05
1951		0.47	0.83	0.60	0.49	5.47	2.23	2.15	1.97	1.26	1.11	0.27	0.22	17.07
1952		0.45	0.32	0.43	2.43	1.31	1.22	2.27	1.72	1.01	0.01	0.99	0.47	12.63
1953		0.39	0.30	0.74	0.69	0.94	0.49	2.32	2.14	0.38	3.73	0.32	0.32	12.76
1954		0.16	0.04	0.10	1.79	4.25	1.28	0.73	2.20	0.34	1.61	0.08	0.34	12.97
1955		0.56	0.13	0.11	0.64	4.10	2.11	2.56	1.07	2.09	2.10	0.13	0.02	15.62
1956		0.08	0.94	0.04	0.30	2.25	1.89	0.95	0.18	0.96	0.01	0.19	0.19	9.48
1957		0.38	0.98	1.93	2.58	4.76	3.09	1.25	2.30	1.07	3.07	1.33	0.08	22.82
1958		1.34	0.62	2.20	1.93	2.81	1.57	4.45	1.48	2.82	0.90	0.63	0.44	20.96
1959		0.22	0.20	0.30	1.26	3.47	3.51	3.30	1.90	1.28	2.32	0.20	2.35	20.51
1960		1.11	1.03	0.62	0.74	1.23	3.81	0.64	1.74	2.49	4.54	0.01	1.33	25.29
1961		0.60	0.90	2.10	0.25	1.58	3.73	4.38	2.01	1.46	0.84	1.82	0.29	20.08
1962		0.46	0.17	0.29	1.09	0.84	4.24	4.55	1.55	3.36	1.61	0.55	0.45	18.96
1963		0.05	0.66	0.21	0.65	3.39	3.72	2.29	2.66	1.42	0.59	0.72	0.22	16.68
1964		0.20	1.18	0.23	0.07	1.40	2.48	1.55	2.53	1.55	1.64	0.71	1.31	13.61
1965		0.20	0.49	0.51	0.66	2.61	6.30	1.34	2.33	1.92	1.43	0.05	0.61	18.45
1966		0.55	0.54	0.17	1.54	0.84	2.98	1.98	5.10	2.32	0.31	0.10	0.12	16.55
1967		0.01	0.20	0.55	1.15	1.51	4.26	3.64	1.70	1.69	0.56	0.33	0.45	16.05
1968		1.32	0.79	1.20	0.90	3.36	2.54	2.64	3.07	0.90	1.33	1.40	0.21	19.66
1969		0.02	1.06	1.39	1.05	4.21	2.58	2.23	2.57	3.72	3.51	0.54	0.56	23.44
1970		0.04	0.22	1.67	1.12	0.90	1.83	1.17	1.74	2.01	1.12	0.22	0.04	12.08
NORMA		0.56	0.58	0.76	1.24	1.83	2.76	2.72	2.19	1.95	1.83	0.56	0.62	18.59
LOW ROLLING PLAINS 02														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		1.02	2.73	1.73	4.46	7.83	6.29	3.07	3.94	3.53	7.95	0.51	1.22	44.26
1942		0.13	0.24	0.67	5.55	1.91	1.57	1.32	3.51	3.80	4.47	0.44	0.10	25.87
1943		0.22	0.10	1.45	1.80	4.08	2.36	1.08	0.17	1.72	0.67	1.02	2.35	17.21
1944		2.04	2.44	0.75	1.72	2.25	2.43	2.42	2.71	1.96	2.60	2.13	2.57	25.74
1945		1.33	1.65	1.50	2.23	0.78	3.03	4.06	2.01	3.13	3.28	0.39	0.25	28.23
1946		1.85	0.89	0.95	0.96	3.03	2.27	0.52	1.59	4.07	2.03	1.74	2.06	21.96
1947		0.93	0.22	1.38	2.20	6.27	1.72	0.60	0.53	0.90	2.01	2.19	1.74	20.69
1948		0.39	1.93	0.85	0.79	3.14	3.28	2.85	1.50	0.45	1.94	0.41	0.23	17.76
1949		3.74	0.96	1.10	2.56	5.13	3.21	1.27	4.38	3.53	3.11	0.01	0.21	26.11
1950		0.84	0.75	0.07	4.13	5.15	2.94	5.07	3.60	4.39	0.14	0.01	0.04	24.92
1951		0.21	0.77	1.11	1.30	4.36	3.75	1.89	2.04	1.98	0.52	0.25	0.04	19.33
1952		0.64	0.39	0.84	1.80	3.37	0.48	1.77	0.44	1.53	0.00	1.90	0.04	15.14
1953		0.14	0.72	1.85	1.69	1.93	1.20	3.25	3.19	0.56	5.11	0.71	0.21	20.16
1954		0.47	0.07	0.16	3.44	6.44	2.30	0.14	0.90	0.20	0.97	0.85	1.30	16.33
1955		1.08	0.81	0.86	0.64	5.76	4.35	1.87	0.90	3.92	3.17	0.08	0.14	23.62
1956		0.48	0.80	0.08	0.96	3.98	0.71	1.11	0.52	0.34	2.50	0.43	1.11	13.01
1957		0.85	1.56	1.39	0.54	6.52	3.83	0.94	1.11	1.67	3.49	3.44	0.31	33.27
1958		1.44	1.22	1.95	2.60	3.91	1.76	3.51	1.37	3.09	1.29	0.74	0.23	23.11
1959		0.09	0.31	0.39	1.62	4.38	5.23	4.49	1.25	1.36	5.01	0.64	0.98	27.77
1960		1.69	1.22	0.59	0.79	1.66	3.21	4.30	2.08	1.88	5.85	0.08	2.06	27.23
1961		1.55	1.51	1.95	0.21	1.41	5.41	4.59	1.00	3.12	1.57	2.91	0.61	26.86
1962		0.23	0.10	0.74	2.57	0.79	5.93	3.15	1.09	6.38	2.38	1.31	0.96	25.72
1963		0.04	0.44	0.81	1.50	4.49	3.56	1.07	1.83	1.68	0.90	2.41	0.88	19.51
1964		0.05	0.71	0.90	0.95	2.85	1.88	0.70	2.29	3.70	0.73	0.97	0.67	20.38
1965		0.78	0.95	0.35	1.13	4.82	3.03	0.67	2.41	2.86	1.13	0.42	0.88	21.43
1966		1.08	0.68	0.59	4.15	0.93	2.02	1.16	6.02	4.44	0.81	0.14	0.07	22.13
1967		0.02	0.21	1.06	2.09	2.12	3.25	3.22	0.74	3.74	1.50	1.11	0.94	20.00
1968		3.70	1.70	2.23	1.84	3.38	2.49	3.13	2.98	1.10	0.91	3.07	0.46	27.02
1969		0.21	1.48	2.14	1.30	5.20	2.50	0.71	3.10	5.01	3.62	0.94	1.67	26.13
1970		0.05	1.09	2.98	1.54	2.09	1.13	0.10	1.12	2.55	1.61	0.16	0.22	14.64
NORMA		0.93	0.98	1.12	2.16	3.82	2.91	2.16	1.94	2.62	2.44	1.08	1.01	23.18
NORTH CENTRAL 03														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		1.32	4.21	2.43	5.26	4.79	6.89	3.16	4.14	1.50	6.72	1.14	1.96	43.50
1942		0.68	0.83	1.17	10.87	4.48	4.40	0.74	3.26	4.62	5.34	1.38	2.39	40.16
1943		0.40	0.46	3.30	1.89	4.98	2.90	1.16	0.12	2.92	1.71	0.77	3.26	23.87
1944		3.47	4.56	2.27	3.07	7.15	1.49	2.04	3.29	1.86	2.23	4.18	3.93	35.38
1945		1.94	4.87	6.14	4.44	2.03	4.03	4.04	2.45	4.00	3.55	1.70	2.26	40.90
1946		3.60	3.03	3.07	3.10	6.56	2.23	0.84	3.36	4.01	1.38	6.08	2.91	40.27
1947		1.98	0.54	2.89	3.28	4.09	2.70	0.50	2.68	1.68	2.08	2.38	3.95	28.75
1948		1.62	2.94	1.49	1.94	4.91	3.62	2.95	0.84	0.84	1.39	0.81	1.07	24.02
1949		5.16	2.87	2.52	3.42	5.49	4.03	1.48	2.04	2.88	5.98	0.14	2.09	37.90
1950		1.10	3.18	0.62	4.21	5.34	3.21	5.75	3.16	3.67	0.52	0.29	0.08	33.06
1951		0.82	2.37	1.23	1.78	3.91	5.95	1.66	0.88	2.68	2.30	0.98	0.34	29.99
1952		0.66	1.67	2.25	5.22	5.00	0.56	1.16	0.40	1.12	0.05	5.38	93	26.40
1953		0.55	1.27	3.04	3.80	4.37	0.97	2.58	2.50	1.62	4.99	2.08	1.90	29.67
1954		1.89	0.56	0.60	3.73	4.28	1.34	0.97	0.95	1.44	3.47	1.98	1.16	22.37
1955		1.61	2.37	1.68	2.62	5.62	3.94	1.66	2.16	3.61	0.92	0.26	0.80	27.25
1956		1.83	2.49	0.27	1.84	3.88	1.06	0.61	0.74	0.27	2.23	2.39	2.42	20.73
1957		1.36	2.72	0.19	11.45	3.05	0.98	0.68	1.17	5.47	5.94	1.86	1.86	34.87
1958		2.09	1.81	3.22	3.20									

MONTHLY AND ANNUAL DIVISIONAL AVERAGES PRECIPITATION (INCHES)

DIVISIONS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
EAST TEXAS	04													
1941		2.54	4.02	4.55	4.40	5.54	7.70	5.06	2.38	5.32	8.00	3.12	3.31	55.94
1942		1.79	1.73	2.58	7.57	4.48	5.62	2.82	6.63	3.80	1.86	2.18	4.12	44.98
1943		2.94	0.75	3.03	2.00	5.52	2.34	4.34	1.42	3.16	2.50	2.63	4.27	34.90
1944		6.86	5.51	4.92	5.23	11.72	1.86	0.94	5.83	2.00	0.44	7.39	8.15	60.85
1945		4.32	4.87	7.89	5.31	4.24	5.05	5.79	3.99	2.72	1.98	2.59	56.01	
1946		7.29	5.32	5.25	3.81	9.76	4.34	2.40	4.00	2.48	2.87	11.07	3.08	61.67
1947		4.86	1.87	5.37	3.09	6.78	2.70	1.32	2.50	2.78	1.33	4.48	5.27	42.55
1948		3.63	4.04	2.67	4.12	5.15	1.36	2.20	1.35	1.02	1.07	4.94	2.49	34.04
1949		7.55	3.73	4.59	5.02	2.19	3.65	5.65	2.78	3.31	11.52	0.42	5.34	55.95
1950		5.09	5.70	2.64	5.15	7.32	4.03	3.76	1.79	4.85	1.02	1.39	1.03	43.97
1951		3.31	3.53	4.03	1.78	2.55	3.75	2.15	0.64	6.26	1.24	2.58	3.55	35.37
1952		3.04	4.72	3.31	6.82	6.03	0.98	3.47	0.63	0.73	0.08	6.52	4.78	41.11
1953		2.50	3.48	5.01	6.75	8.90	2.57	4.40	2.90	1.72	2.37	2.95	5.79	49.34
1954		2.93	1.20	1.10	3.66	6.50	0.74	1.10	0.76	1.22	7.50	3.30	2.68	33.69
1955		3.21	4.96	2.30	5.10	4.72	2.18	3.19	6.16	2.54	1.55	0.96	1.80	38.67
1956		3.22	4.94	2.00	2.60	3.96	2.49	1.42	2.13	0.67	1.56	3.86	2.36	31.29
1957		2.93	3.50	2.38	11.85	4.51	5.96	1.71	2.70	5.23	9.02	8.14	2.73	60.66
1958		4.17	2.30	2.49	6.20	3.40	4.39	3.03	4.15	9.16	2.17	2.83	1.21	45.50
1959		0.98	4.79	2.15	6.11	6.33	4.12	6.36	3.04	2.33	4.49	2.28	5.98	48.96
1960		4.32	4.35	2.18	2.69	1.94	6.88	2.89	4.24	4.28	5.49	4.45	8.74	41.53
1961		5.36	4.56	5.14	1.50	7.23	7.98	5.22	2.35	5.73	1.70	5.04	5.56	52.37
1962		4.05	2.61	1.85	4.77	2.28	6.28	2.22	1.46	4.88	3.37	4.32	3.15	41.24
1963		1.78	2.12	1.67	4.03	2.42	2.92	3.30	1.33	3.43	0.28	4.74	3.31	31.33
1964		2.87	2.74	3.93	5.18	3.48	1.66	1.32	3.61	4.90	0.99	3.39	2.74	36.81
1965		3.28	6.11	3.81	1.33	8.18	2.46	1.40	2.44	4.62	1.26	2.73	5.45	43.07
1966		4.15	4.65	1.34	10.54	4.54	1.22	1.94	5.57	3.80	3.84	1.38	3.21	45.78
1967		1.30	2.28	2.87	5.02	7.77	8.83	3.40	1.43	3.30	2.94	3.04	4.44	44.44
1968		5.60	2.61	3.40	6.79	8.31	7.05	2.16	1.75	5.92	2.71	6.14	4.54	58.58
1969		1.81	4.89	6.47	5.51	6.47	1.37	1.93	1.56	2.55	4.13	3.77	5.23	45.79
1970		1.52	4.22	4.16	4.07	3.87	2.04	1.78	2.19	4.94	7.14	1.86	1.92	39.77
NORWA		3.64	3.74	3.47	4.94	5.34	3.60	3.02	2.81	3.67	3.36	3.74	4.05	45.37
TRANS. PECO	04													
1941		1.15	0.89	0.89	2.25	4.43	3.61	2.02	2.01	3.06	3.96	0.15	0.72	27.15
1942		0.13	0.19	0.05	0.06	0.82	1.21	1.14	4.14	1.29	0.80	0.19	1.24	11.86
1943		0.29	0.00	0.37	0.15	1.25	2.35	2.14	0.43	2.15	0.53	0.70	0.93	11.44
1944		0.97	0.73	0.02	0.00	0.86	2.08	1.35	3.24	3.70	0.56	1.00	1.10	15.54
1945		0.14	0.08	0.93	0.56	0.18	0.21	3.23	1.13	0.81	3.58	0.00	0.00	10.91
1946		2.67	0.00	0.02	0.41	0.50	1.14	0.89	1.04	2.49	1.11	0.12	0.03	12.07
1947		1.12	0.00	0.00	0.05	1.23	1.16	0.76	1.57	0.67	0.32	0.78	0.72	12.14
1948		0.24	0.23	0.02	0.29	0.73	1.26	1.65	0.92	0.51	0.89	0.10	0.54	14.42
1949		2.06	0.28	0.04	1.75	1.29	1.30	1.85	1.60	2.55	1.52	0.00	0.63	14.91
1950		0.42	0.29	0.02	0.37	0.57	1.63	3.35	1.07	2.61	0.80	0.00	0.00	11.13
1951		0.09	0.21	0.94	0.12	1.15	0.98	1.43	1.14	0.70	0.29	0.04	0.24	7.33
1952		0.34	0.27	0.21	0.85	1.20	2.32	2.84	0.28	0.44	0.22	0.67	0.56	8.80
1953		0.00	0.23	0.38	0.33	0.25	0.42	1.48	0.77	0.17	1.17	0.00	0.22	2.86
1954		0.16	0.06	0.16	0.42	0.43	1.30	0.68	2.02	0.26	0.78	0.00	0.03	6.35
1955		0.76	0.03	0.05	0.29	0.05	0.83	0.75	1.22	1.29	0.96	0.48	0.06	6.77
1956		0.47	0.44	0.02	0.18	0.68	0.62	1.00	0.81	0.47	0.37	0.01	0.23	5.27
1957		0.29	1.50	4.37	0.25	1.44	0.34	1.47	1.57	0.55	2.19	0.62	0.13	14.80
1958		1.68	0.99	1.00	0.34	0.95	1.69	1.63	1.77	4.52	2.18	0.28	0.06	17.05
1959		0.05	0.31	0.05	0.46	1.87	1.12	1.95	1.84	0.68	1.19	0.73	0.52	10.76
1960		1.06	0.17	0.21	0.31	0.46	1.11	3.96	2.24	0.30	1.93	0.39	1.42	13.76
1961		0.90	0.17	0.25	0.14	1.18	0.54	1.22	0.54	0.75	0.55	0.83	0.23	9.67
1962		0.40	0.23	0.15	0.38	0.58	1.31	2.33	0.49	2.55	1.30	0.37	0.04	10.73
1963		0.09	0.43	0.06	0.66	1.69	1.10	1.40	4.05	1.35	0.78	0.63	0.20	10.44
1964		0.10	0.03	0.50	0.08	0.91	1.17	0.93	1.29	2.40	0.33	0.07	0.51	8.30
1965		0.15	1.08	0.12	0.08	1.34	1.04	0.55	1.62	1.57	0.20	0.31	0.62	9.30
1966		0.44	0.11	0.23	1.09	0.88	2.80	0.70	3.64	2.15	1.70	0.01	0.02	13.80
1967		0.05	0.14	0.44	0.31	0.33	1.38	1.32	1.59	0.26	0.52	0.65	0.34	6.34
1968		0.64	0.78	1.07	0.70	0.85	0.57	3.56	3.03	1.61	0.50	2.19	0.09	15.33
1969		0.06	0.23	0.28	0.96	0.96	1.16	1.06	1.00	1.29	1.01	1.35	0.82	11.71
1970		0.16	1.13	1.16	0.16	0.53	2.18	1.05	2.12	3.65	1.09	0.00	0.08	13.31
NORWA		0.58	0.38	0.49	0.51	1.08	1.39	1.76	1.65	1.67	1.15	0.42	0.48	11.57
EDWARDS PLATEAU	07													
1941		1.51	3.57	4.11	4.77	2.97	3.63	2.87	1.72	4.10	4.32	0.65	0.67	34.83
1942		0.14	0.84	0.48	4.55	2.40	1.34	1.65	4.64	3.00	4.52	0.66	1.12	25.98
1943		0.50	0.09	1.66	1.32	3.85	2.81	2.28	0.18	4.82	0.89	1.55	1.93	21.88
1944		2.97	2.89	2.13	1.16	6.54	1.88	0.64	5.85	2.66	1.80	2.80	2.72	34.04
1945		2.29	2.34	2.95	2.56	0.98	3.15	2.12	1.55	3.82	2.19	0.79	2.58	27.32
1946		2.65	1.28	0.94	3.23	3.82	2.52	0.64	1.59	4.83	2.80	1.66	1.73	27.53
1947		3.51	0.30	1.77	1.60	1.58	2.19	0.89	2.48	0.86	0.61	1.73	1.28	15.61
1948		0.32	1.65	0.75	2.75	2.44	3.73	2.30	1.29	2.09	1.48	0.58	0.89	20.21
1949		3.06	3.02	1.31	5.12	1.87	3.73	1.75	3.13	2.91	1.85	0.00	2.28	33.03
1950		0.72	1.84	0.17	2.84	3.48	2.13	2.71	2.53	3.17	3.88	0.20	0.00	19.97
1951		0.06	0.97	1.87	1.19	2.93	1.98	0.47	1.08	1.53	0.93	0.40	0.33	13.74
1952		0.31	0.97	1.67	3.27	4.26	1.18	0.86	0.08	6.52	0.01	2.50	2.95	24.58
1953		0.37	0.76	1.85	1.55	2.21	0.54	1.51	2.92	2.49	3.78	0.22	0.86	18.84
1954		0.55	0.11	0.32	0.55	2.40	1.28	0.78	0.52	0.83	2.85	0.00	0.09	22.89
1955		1.50	1.57	0.64	0.38	3.70	2.42	2.99	2.24	2.43	0.52	0.73	0.54	19.68
1956		0.80	0.90	0.06	0.68	1.89	0.50	0.76	1.20	0.63	1.76	0.92	1.12	11.22
1957		0.62	1.89	3.40	7.36	7.83	1.97	0.41	0.56	4.07	6.02	0.33	0.79	38.25
1958		2.88	3.11	1.95	1.13	3.79	4.85	0.42	2.65	6.01	3.83	0.81	0.82	32.05
1959		0.31	1.68	0.09	2.74	2.78	6.14	3.39	1.92	2.21	6.34	1.28	2.42	31.30
1960		1.58	1.72	1.37	1.09	1.18	1.10	4.10	3.50	0.91	5.05	0.95	3.34	25.90
1961		2.52	2.52	0.43	0.44	1.32	6.85	3.73	0.92	6.85	2.42	1.38	0.93	33.30
1962		0.29	0.44	0.68	3.24	2.71	0.70	0.93	2.72	2.52	1.12	1.03	1.70	17.62
1963		0.10	1.37	0.22	1.69	3.74	1.91	0.23	1.28	1.76	1.23	2.58	0.67	16.78
1964		1.92	1.35	1.70	1.76	1.77	0.91	0.95	2.44	7.33	1.26	1.42	0.54	23.37
1965		1.18	3.34	0.78	1.61	5.76	2.44	0.67	1.24	2.54	2.08	1.11	1.81	24.53
1966		0.96	1.26	0.68	3.76	2.55	1.55	0.68	4.74	4.32	1.32	0.02	0.05	

MONTHLY AND ANNUAL DIVISIONAL AVERAGES PRECIPITATION (INCHES)

MONTHLY AND ANNUAL DIVISIONAL AVERAGES PRECIPITATION (INCHES)

DIVISIONS		TEXAS												
LOWER VALLEY	10	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1941		5.63	1.55	4.24	4.09	6.40	6.66	6.57	1.65	3.65	4.03	0.42	2.27	41.16
1942		1.02	1.12	0.28	0.29	1.92	5.71	2.12	0.97	2.41	2.00	0.71	0.40	16.95
1943		2.21	0.39	0.76	0.64	5.49	0.37	0.63	0.16	6.21	1.79	2.80	2.38	24.03
1944		0.56	0.30	1.82	0.49	4.69	2.23	1.73	0.68	4.66	1.73	0.77	1.16	26.82
1945		1.95	1.51	0.37	2.15	1.14	1.92	0.98	5.02	1.40	3.42	0.05	0.59	19.90
1946		3.18	0.83	0.18	2.12	2.03	3.43	0.72	1.08	6.21	3.61	0.42	0.37	24.24
1947		0.87	0.72	0.27	1.94	3.40	1.09	0.76	7.95	0.54	0.29	2.47	1.21	21.51
1948		0.93	3.14	0.99	0.45	2.53	0.97	1.39	2.56	7.50	2.86	0.30	0.02	23.64
1949		1.10	2.75	0.61	3.29	1.29	1.36	1.27	1.33	5.07	1.98	0.24	1.74	22.03
1950		0.67	0.88	1.39	1.32	3.34	2.92	0.27	0.52	1.78	1.83	0.60	0.00	15.52
1951		0.25	0.49	1.67	0.35	2.96	3.45	0.90	1.38	6.44	2.05	0.56	0.11	20.81
1952		0.29	0.47	0.34	0.32	3.55	3.99	1.87	0.16	2.47	0.01	2.66	0.69	17.02
1953		0.39	0.97	0.60	0.59	0.82	0.17	0.88	7.88	0.61	3.58	0.83	0.88	18.20
1954		0.22	0.10	0.36	4.63	0.94	3.39	0.48	1.57	3.41	6.85	1.76	0.10	23.81
1955		0.83	0.45	0.09	0.25	0.88	0.13	3.13	2.76	8.03	1.84	1.22	0.25	19.86
1956		0.02	0.85	0.55	3.06	1.38	1.80	0.43	0.42	2.04	1.49	0.49	0.35	12.88
1957		0.21	2.93	2.56	3.03	1.76	4.99	0.10	0.74	1.12	0.64	3.34	0.76	22.18
1958		6.34	5.08	0.76	0.10	1.47	2.04	1.63	0.19	5.16	11.96	1.38	1.39	37.50
1959		2.04	2.55	0.35	1.63	1.23	3.21	0.60	1.43	0.59	3.90	1.75	0.46	19.74
1960		0.68	1.19	0.92	2.76	1.83	1.82	0.66	4.89	5.23	3.92	1.35	2.71	27.96
1961		1.52	0.42	0.02	2.39	0.53	3.08	1.31	2.68	8.14	0.44	1.08	0.47	22.28
1962		0.59	0.05	1.34	0.84	1.07	3.76	0.00	0.48	2.86	1.53	1.23	2.06	15.81
1963		0.18	0.66	0.08	0.22	4.15	2.43	1.84	1.10	4.31	2.86	2.32	2.33	22.48
1964		0.37	1.17	0.11	1.14	3.97	1.04	0.56	0.08	3.66	0.48	0.94	1.65	15.17
1965		0.45	2.01	0.40	0.32	3.67	0.57	0.58	1.64	4.55	2.14	2.72	3.88	22.93
1966		2.96	1.07	0.74	3.01	7.03	5.52	0.75	1.25	1.03	5.85	0.13	0.26	29.60
1967		1.78	0.94	0.61	0.36	1.74	1.64	0.63	6.55	18.75	3.72	0.41	1.71	40.84
1968		3.04	1.35	0.89	1.40	4.34	5.06	2.42	1.25	3.15	3.43	0.53	0.43	27.29
1969		0.46	2.08	0.81	0.19	3.26	0.60	0.14	3.85	4.82	1.37	2.16	0.22	19.96
1970		3.22	0.63	0.62	1.32	6.03	3.88	2.37	1.80	6.43	2.53	0.13	0.19	29.15
NORTH		1.47	1.29	0.82	1.50	2.83	2.62	1.06	2.33	4.41	2.80	1.26	1.03	23.44

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APPENDIX B
MEAN TEMPERATURE AND PRECIPITATION DATA (1971-1988)
FOR THE TEN CLIMATIC DIVISIONS OF TEXAS

TEMPERATURE DATA FOR THE HIGH PLAINS (TOP) AND LOW ROLLING PLAINS (BOTTOM)

H.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	39.1	39.6	48.3	57.4	65.9	76.7	78.5	73.0	68.5	59.8	48.6	40.9	58.0
1972	38.6	43.2	54.3	62.0	65.8	75.2	76.1	74.7	70.5	59.3	39.6	35.5	57.9
1973	33.5	39.5	48.6	51.6	64.1	74.2	77.3	77.5	68.8	62.1	50.8	40.1	57.3
1974	36.3	43.1	54.6	60.0	71.6	75.5	79.8	74.1	63.3	59.6	47.2	38.0	58.6
1975	38.6	37.6	46.6	55.9	65.5	74.7	75.3	76.7	66.7	60.9	47.3	41.5	57.3
1976	38.0	49.0	49.4	59.5	62.8	74.8	75.2	76.8	69.0	53.0	42.1	38.9	57.4
1977	31.3	44.3	49.1	58.0	69.2	77.9	80.1	78.5	74.4	61.6	49.3	42.0	59.6
1978	30.8	32.0	48.9	62.5	66.1	76.5	81.6	77.2	71.1	60.4	47.5	36.2	57.6
1979	27.9	39.6	48.8	57.8	64.8	73.0	78.9	75.0	71.4	63.1	43.1	40.4	57.0
1980	37.5	40.7	46.6	55.4	64.7	80.0	83.5	79.5	71.9	58.5	45.1	43.6	58.9
1981	40.2	43.5	48.9	62.2	65.8	77.7	80.3	75.6	70.3	59.0	51.0	42.2	59.7
1982	38.1	37.8	49.6	56.9	65.8	71.7	78.6	79.3	72.7	58.7	46.1	38.0	57.8
1983	35.2	39.8	47.8	52.6	64.0	72.1	80.5	81.2	74.1	62.0	50.1	28.4	57.3
1984	34.7	43.1	46.8	54.7	68.3	76.2	78.1	77.3	68.4	56.9	47.7	41.6	57.8
1985	34.1	38.5	51.1	61.1	68.8	74.1	78.9	79.8	70.3	58.6	46.9	36.1	58.2
1986	43.3	43.1	53.9	61.9	67.3	74.1	80.2	76.6	70.5	57.4	45.3	38.7	59.4
1987	36.5	43.3	45.5	56.4	66.5	73.9	77.8	77.1	69.0	59.9	47.6	37.3	57.6
1988	33.4	40.5	47.1	55.9	65.6	74.9	77.0	69.1	77.5	59.8	49.5	39.6	57.5
NORM	37.1	41.4	48.2	58.3	66.8	75.6	79.0	77.6	70.6	60.0	47.4	39.7	58.5

L.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	43.9	45.9	53.8	63.4	71.8	80.7	83.3	76.0	72.5	65.0	53.4	45.7	63.0
1972	42.0	47.5	58.9	68.1	69.6	79.9	80.5	78.9	75.1	63.2	45.2	40.2	62.4
1973	36.8	43.5	55.2	57.2	69.7	77.6	81.5	81.2	73.0	66.1	56.7	45.6	62.0
1974	40.9	49.2	60.6	65.0	75.4	78.9	84.2	79.0	66.9	63.8	51.5	42.5	63.2
1975	43.3	42.3	51.0	61.0	70.1	78.1	79.1	80.0	69.8	64.3	53.1	45.3	61.5
1976	42.4	54.1	55.0	63.5	66.9	78.2	78.5	81.5	72.7	56.2	45.2	41.9	61.3
1977	34.2	48.6	54.8	61.9	72.7	80.9	84.0	82.8	80.0	65.8	53.9	46.3	63.8
1978	33.2	35.1	52.7	67.9	72.0	80.6	86.9	80.6	75.6	64.6	52.4	41.3	61.9
1979	31.4	40.9	53.6	62.0	69.0	77.2	82.5	79.4	75.1	68.3	48.4	44.7	61.0
1980	41.9	44.3	51.5	61.5	70.4	83.4	88.2	85.1	75.8	63.2	50.2	47.0	63.5
1981	43.4	47.0	53.6	66.5	69.8	79.4	84.8	80.9	75.9	64.0	54.7	45.8	63.8
1982	41.8	42.4	55.0	61.4	70.0	75.5	82.3	83.6	76.4	64.0	51.9	43.3	62.3
1983	40.2	44.6	52.1	57.9	68.7	74.9	83.2	85.2	77.3	66.3	54.9	31.4	61.4
1984	38.5	47.9	52.2	60.6	73.4	82.0	83.1	82.4	72.4	61.7	51.8	46.2	62.7
1985	37.0	41.9	55.9	65.2	73.4	77.7	81.8	84.4	74.9	63.6	51.0	39.4	62.2
1986	46.3	49.1	58.4	66.7	72.0	78.3	84.0	81.3	75.0	62.0	49.5	42.7	63.8
1987	40.4	47.1	49.9	61.2	70.8	76.6	80.5	82.2	73.0	64.1	52.5	42.1	61.7
1988	37.8	43.9	53.2	61.6	70.6	78.9	81.2	74.2	82.8	63.6	54.6	44.6	62.3
NORM	41.2	45.9	53.2	63.6	71.3	79.6	83.3	82.4	75.1	64.5	52.3	44.0	63.0

TEMPERATURE DATA FOR NORTH CENTRAL (TOP) AND EAST TEXAS (BOTTOM)

N.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	48.0	49.6	56.3	65.0	72.3	82.2	84.5	78.8	76.3	68.7	56.0	50.9	65.7
1972	44.7	50.1	61.6	69.0	71.8	81.1	81.7	82.7	79.6	66.5	48.6	43.2	65.1
1973	40.6	46.5	59.2	60.1	71.3	77.5	82.5	81.5	76.4	68.2	60.5	48.1	64.4
1974	43.3	51.5	62.8	66.0	75.8	78.8	84.6	80.7	69.1	66.8	54.1	45.8	64.9
1975	48.0	46.1	53.5	63.2	71.7	78.9	81.6	82.4	73.2	66.8	56.6	47.7	64.1
1976	44.8	56.8	58.9	65.0	68.0	77.6	79.7	82.6	75.0	58.7	47.8	44.8	63.3
1977	36.0	50.1	57.4	64.7	73.9	81.8	85.6	84.7	82.0	68.4	58.0	49.0	66.0
1978	35.0	37.8	54.1	67.9	74.1	81.3	87.9	83.5	78.6	67.6	57.1	45.5	64.2
1979	34.7	42.4	56.9	64.0	68.9	78.4	82.8	80.9	75.1	69.8	51.4	48.2	62.8
1980	45.5	46.5	54.2	62.7	72.5	83.8	88.1	86.3	79.7	65.0	54.1	49.4	65.7
1981	45.4	49.3	56.0	69.2	70.7	79.4	84.3	82.5	76.0	66.5	57.4	47.5	65.4
1982	45.0	44.8	59.5	62.7	72.2	78.1	83.6	85.3	77.4	66.2	55.2	48.5	64.9
1983	43.4	47.7	54.1	60.5	69.8	76.0	82.4	84.3	77.0	67.9	57.9	35.3	63.0
1984	40.0	50.7	56.8	64.1	74.2	81.2	84.0	84.4	75.1	66.1	54.5	52.5	65.3
1985	38.8	44.2	59.9	66.9	73.5	79.1	82.9	86.1	77.5	67.2	56.8	42.7	64.6
1986	48.6	52.4	59.8	67.6	71.8	79.5	85.0	82.6	79.2	65.3	52.8	45.4	65.8
1987	44.1	50.4	53.6	63.8	73.7	78.0	81.6	85.1	75.6	65.5	55.5	46.8	64.5
1988	41.2	47.0	55.8	64.1	71.5	78.3	83.0	77.5	85.2	65.5	57.6	48.2	64.6
NORM	43.8	48.3	55.8	65.2	72.4	80.0	84.1	83.8	77.1	66.9	55.2	47.1	65.0

E.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	51.3	51.1	55.9	64.7	71.1	80.9	83.2	79.4	77.1	69.9	56.9	58.4	66.4
1972	49.5	51.8	61.1	67.6	71.9	79.6	80.0	81.3	79.9	66.4	50.5	45.3	65.4
1973	43.4	48.4	60.4	61.5	70.8	77.5	81.8	79.4	77.0	69.3	62.5	49.1	65.1
1974	47.5	52.1	63.9	65.5	75.2	76.8	82.5	80.5	70.7	66.5	55.5	48.1	65.4
1975	51.1	49.4	55.4	64.4	73.3	78.4	81.1	81.4	73.4	67.3	56.6	48.5	65.0
1976	46.3	57.4	59.3	65.6	68.1	76.4	79.6	80.2	74.4	58.7	48.8	45.9	63.4
1977	37.4	50.3	58.6	65.4	74.1	80.5	84.0	83.0	79.7	67.4	58.9	48.7	65.7
1978	36.4	39.7	54.3	66.8	73.7	80.2	85.5	83.4	78.2	66.6	59.5	47.5	64.3
1979	37.1	44.9	58.2	64.6	70.0	78.1	81.2	80.4	73.7	68.2	52.5	48.8	63.1
1980	48.6	47.0	55.0	62.0	72.6	81.5	85.9	84.9	80.7	63.7	54.0	49.5	65.5
1981	45.5	49.6	56.3	70.0	70.0	79.8	82.9	81.9	74.6	66.2	57.9	47.9	65.2
1982	46.1	46.5	60.6	62.7	72.8	78.5	83.0	84.0	76.2	65.3	56.2	51.2	65.3
1983	44.6	48.8	54.8	60.3	69.8	76.3	81.2	82.6	75.5	67.0	57.6	38.6	63.1
1984	40.9	50.7	57.1	64.6	72.8	79.3	82.0	82.5	75.0	68.3	55.3	57.4	65.5
1985	40.1	45.8	61.8	67.2	72.7	79.6	82.1	84.6	77.3	68.6	60.6	44.2	65.4
1986	49.2	54.6	59.5	67.2	71.9	79.7	84.2	81.8	79.3	65.8	55.9	46.7	66.3
1987	45.8	51.5	55.5	63.8	74.6	78.5	81.3	84.8	75.4	64.0	56.4	49.5	65.1
1988	42.4	48.2	56.2	64.2	71.0	78.4	82.4	77.6	83.6	65.5	58.7	49.8	64.8
NORM	46.4	50.3	57.4	65.8	72.7	79.3	82.6	82.4	76.4	67.1	56.6	49.4	65.6

TEMPERATURE DATA FOR THE TRANS PECOS (TOP) AND EDWARDS PLATEAU (BOTTOM)

T.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	47.8	49.3	57.3	63.2	71.8	78.9	80.8	75.2	73.0	63.8	55.1	48.2	63.7
1972	47.5	50.3	61.5	68.2	71.1	78.4	79.9	77.1	74.5	65.8	49.3	45.3	64.1
1973	41.5	45.7	55.0	59.2	70.2	77.5	79.0	77.8	74.1	65.3	56.7	46.3	62.4
1974	45.9	48.0	62.0	65.4	75.1	80.1	80.3	77.3	68.2	63.6	52.1	44.4	63.5
1975	45.1	48.9	55.2	61.5	69.8	79.3	76.9	78.1	70.1	64.4	53.9	45.9	62.4
1976	43.5	54.0	57.5	64.7	68.3	79.0	76.5	78.6	71.2	57.9	46.3	42.7	61.7
1977	42.8	49.4	54.1	63.5	73.2	80.3	81.3	83.6	79.5	66.0	54.8	50.2	64.9
1978	43.3	45.4	57.9	67.9	74.3	81.2	82.7	78.8	71.6	63.4	55.6	45.1	63.9
1979	41.3	47.7	55.4	64.7	70.4	76.6	82.2	77.6	72.8	67.4	50.4	46.3	62.7
1980	47.9	50.0	55.5	62.0	72.7	85.3	85.8	80.7	75.2	62.0	50.0	48.8	64.7
1981	46.0	51.0	55.0	66.1	71.7	80.2	82.0	77.9	74.5	65.3	56.6	50.0	64.7
1982	46.4	48.8	59.7	65.7	71.3	80.1	82.7	82.3	77.4	65.3	52.8	44.5	64.8
1983	44.3	49.7	56.4	60.4	72.1	78.8	82.7	81.7	77.8	67.4	56.0	43.5	64.2
1984	43.0	48.7	56.9	64.6	74.9	78.6	80.4	80.0	72.8	62.9	52.9	49.8	63.8
1985	40.9	47.0	58.9	66.4	74.9	78.6	80.1	81.5	74.3	64.4	57.1	45.3	64.1
1986	47.6	53.7	59.1	70.0	73.3	77.8	80.3	79.6	75.1	63.5	52.5	44.4	64.7
1987	44.3	49.1	52.2	60.3	69.5	77.0	80.3	79.8	72.7	67.0	53.0	45.5	62.6
1988	43.0	49.4	55.4	63.7	71.9	78.3	79.1	73.6	78.8	66.5	56.1	45.4	63.4
NORM	45.0	49.5	56.0	64.6	72.3	79.5	80.8	79.4	73.9	64.6	53.1	46.4	63.8

E.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	51.0	51.5	59.3	65.8	74.4	80.0	81.7	75.9	74.5	67.3	57.2	51.5	65.8
1972	48.4	52.0	63.5	71.3	71.5	78.8	80.8	79.0	78.0	67.0	50.5	46.2	65.6
1973	42.0	47.2	60.0	62.1	72.7	77.3	80.7	80.1	76.2	67.7	61.1	48.8	64.7
1974	46.9	51.9	65.2	67.4	76.1	79.8	82.7	79.3	69.1	65.9	54.3	46.5	65.4
1975	48.7	49.4	57.3	65.2	72.2	79.0	78.9	80.6	72.3	66.4	56.7	48.4	64.6
1976	45.1	57.3	60.7	66.3	69.4	78.9	76.7	79.9	74.5	58.9	49.2	45.3	63.5
1977	40.6	50.5	57.8	64.3	73.7	80.1	83.1	84.9	82.2	68.6	57.3	50.6	66.1
1978	40.5	42.9	57.2	69.9	76.0	80.3	85.0	80.6	75.4	65.5	57.4	46.1	64.7
1979	38.8	47.4	58.4	66.3	71.0	77.2	83.1	80.4	75.6	70.8	52.6	48.8	64.4
1980	48.2	49.7	57.0	64.6	73.4	83.7	86.5	83.1	78.6	64.9	53.1	50.2	66.1
1981	47.3	50.9	56.2	68.2	72.3	78.5	82.6	81.2	76.2	67.7	58.4	49.6	65.8
1982	47.4	47.2	61.1	66.4	72.4	79.9	83.4	84.1	78.1	67.6	56.2	48.2	66.0
1983	45.4	49.9	57.1	63.5	73.3	77.4	82.6	83.2	78.0	69.2	58.9	39.5	64.8
1984	42.3	51.1	59.6	67.0	76.0	81.5	82.6	83.0	74.7	66.3	55.2	54.1	66.1
1985	41.2	46.7	60.2	68.0	75.6	78.7	81.0	84.4	76.9	67.8	59.9	44.8	65.4
1986	48.7	54.7	60.9	71.3	73.8	78.8	83.1	81.9	78.5	65.0	54.6	46.7	66.5
1987	46.0	51.0	52.8	62.0	72.2	76.6	80.5	82.8	74.4	67.0	55.2	48.3	64.1
1988	42.8	49.0	58.0	65.6	72.1	78.5	81.2	76.2	82.1	67.6	59.0	49.1	65.1
NORM	46.5	50.8	58.1	66.8	73.5	79.9	82.7	82.2	76.6	67.1	56.1	48.8	65.8

TEMPERATURE DATA FOR SOUTH CENTRAL TX (TOP) AND THE UPPER COAST (BOTTOM)

S.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	57.9	57.9	64.4	68.9	76.6	82.8	85.1	81.2	79.1	73.0	63.0	59.6	70.8
1972	55.4	57.2	67.2	73.3	74.3	80.8	81.9	82.3	82.1	72.1	55.4	50.4	69.4
1973	47.8	52.3	65.5	65.3	74.4	79.0	83.2	81.5	79.5	73.0	68.1	55.4	68.8
1974	52.3	57.6	68.1	70.2	78.2	79.8	83.3	82.3	74.3	70.7	59.6	53.3	69.1
1975	56.2	55.5	63.7	69.8	76.1	80.9	82.0	82.4	76.6	71.3	62.5	54.2	69.3
1976	52.0	61.9	64.6	69.8	71.7	80.0	80.4	82.6	78.7	63.1	53.7	50.7	67.4
1977	44.7	55.1	63.1	68.1	75.7	81.6	84.2	85.8	83.3	72.7	63.6	56.2	69.5
1978	44.5	46.9	60.3	70.0	78.5	81.9	85.6	83.9	79.1	70.5	63.7	53.3	68.2
1979	44.5	51.9	63.6	69.7	72.9	79.9	83.1	82.6	76.5	73.3	58.2	54.0	67.5
1980	54.4	53.7	61.9	67.0	76.2	84.2	87.0	84.6	82.1	68.9	58.0	55.0	69.4
1981	51.9	55.6	61.2	73.1	74.8	81.2	83.2	83.6	78.3	72.3	64.3	55.3	69.6
1982	52.9	52.3	64.6	68.5	75.2	82.0	85.7	85.8	80.6	70.5	61.2	54.7	69.5
1983	50.2	53.5	59.9	66.1	74.4	79.6	82.6	83.8	78.4	71.7	64.3	45.2	67.5
1984	48.0	55.8	63.7	70.9	76.6	81.6	83.9	84.0	78.0	72.8	61.3	61.7	69.9
1985	45.6	50.9	65.5	70.5	76.5	80.9	82.6	85.8	80.4	72.2	65.3	50.5	68.9
1986	54.3	58.9	63.4	72.4	74.8	81.2	84.6	83.8	81.9	69.5	60.7	51.7	69.8
1987	51.0	55.9	58.4	66.4	76.1	79.6	82.5	84.7	78.9	70.2	61.0	55.0	68.3
1988	47.7	53.6	61.3	68.7	74.3	80.2	84.1	80.6	85.8	72.6	65.8	56.2	69.2
NORM	51.8	55.7	62.3	70.0	76.0	81.5	84.1	84.2	79.7	71.5	61.6	54.8	69.4

U.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	57.3	57.2	61.5	68.0	75.0	81.6	84.0	81.4	78.6	73.2	62.7	61.0	70.1
1972	57.2	56.7	65.5	72.1	74.6	80.7	81.3	82.1	81.4	71.3	56.5	51.8	69.3
1973	48.7	52.3	65.1	65.4	74.1	79.5	83.5	80.9	79.6	73.9	68.7	54.8	68.9
1974	55.0	57.2	66.8	69.5	77.2	79.5	82.6	81.8	75.2	71.0	61.0	54.4	69.3
1975	56.9	56.5	62.4	68.5	76.6	80.2	82.3	81.8	76.2	70.9	62.0	54.1	69.0
1976	52.0	60.6	63.7	69.4	72.0	79.2	81.2	82.2	78.3	62.9	53.5	51.0	67.2
1977	44.9	54.6	63.0	68.1	75.8	81.7	83.4	83.7	81.7	71.3	64.1	55.9	69.0
1978	44.2	46.3	59.0	68.8	77.5	81.8	84.1	83.7	79.7	70.6	65.6	54.6	68.0
1979	45.6	51.6	63.0	69.7	72.9	80.3	82.4	82.2	76.1	71.9	57.6	53.4	67.2
1980	55.7	52.6	60.9	66.0	76.0	83.0	85.6	83.9	82.9	68.1	57.9	55.3	68.9
1981	51.0	54.1	60.9	72.8	74.5	81.5	83.7	83.4	78.0	72.2	64.7	55.6	69.4
1982	53.0	52.9	64.1	68.2	75.3	82.3	84.4	84.3	79.9	70.6	62.3	57.0	69.5
1983	51.3	54.3	59.4	64.9	73.7	79.4	82.5	83.0	77.3	71.3	64.3	47.5	67.4
1984	48.1	55.7	62.3	69.4	75.5	80.5	82.6	82.5	77.1	74.0	61.8	63.6	69.4
1985	47.0	50.8	65.1	70.7	76.7	81.1	82.0	84.3	79.8	72.5	67.1	51.7	69.1
1986	54.9	59.8	63.3	71.6	75.6	81.4	84.5	83.2	82.0	70.3	62.9	52.6	70.2
1987	51.8	56.6	59.9	66.9	76.7	80.5	82.8	84.9	78.7	68.6	61.1	56.4	68.7
1988	48.2	53.9	61.4	68.0	73.6	79.3	83.2	79.7	84.6	71.9	65.6	56.3	68.8
NORM	52.4	55.6	61.8	69.4	75.6	81.1	83.3	83.1	79.4	71.3	62.1	55.4	69.2

TEMPERATURE DATA FOR SOUTHERN TEXAS (TOP) AND THE LOWER VALLEY (BOTTOM)

S	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	60.9	60.8	68.2	72.2	80.3	83.8	84.4	81.4	79.5	73.6	64.6	60.4	72.5
1972	57.7	58.8	69.6	76.7	75.5	81.3	82.8	83.7	83.0	74.2	58.0	53.2	71.2
1973	49.9	53.9	68.6	69.2	77.9	80.9	83.8	82.2	80.3	73.4	69.1	56.3	70.5
1974	55.0	59.3	70.3	72.7	80.1	81.7	84.2	84.6	75.9	71.6	61.3	53.7	70.9
1975	57.5	58.5	68.0	73.7	79.4	82.5	82.4	83.5	77.8	73.0	64.4	56.9	71.5
1976	53.3	64.0	68.3	72.2	74.4	82.8	80.7	82.9	81.1	65.3	55.5	51.9	69.4
1977	48.1	57.1	65.2	70.2	77.9	83.2	85.3	87.4	85.3	74.6	65.7	57.8	71.5
1978	48.2	50.8	65.1	75.1	81.8	84.1	87.4	84.6	79.9	71.3	65.2	55.5	70.8
1979	47.7	54.5	66.0	72.6	75.9	81.2	86.3	85.3	78.6	75.9	60.9	56.2	70.1
1980	56.8	56.6	66.0	71.7	79.8	87.3	88.6	84.9	83.5	71.7	59.1	56.4	71.9
1981	53.7	56.7	63.1	74.6	77.6	81.9	84.3	84.9	80.1	74.4	66.1	57.0	71.2
1982	55.7	54.8	67.2	72.3	77.0	84.1	87.1	87.2	82.9	72.5	63.8	56.3	71.7
1983	52.5	56.7	63.6	70.7	79.0	82.7	85.1	86.3	81.2	74.2	66.7	47.9	70.6
1984	50.0	58.9	68.2	75.7	79.7	84.0	85.7	86.1	79.7	74.6	63.0	63.1	72.4
1985	47.9	53.7	67.7	73.3	79.0	81.9	84.0	87.3	83.0	74.2	67.6	52.6	71.0
1986	56.0	61.7	66.6	77.0	78.3	82.7	86.4	86.5	84.5	72.4	61.8	53.8	72.3
1987	53.4	58.0	60.5	67.4	78.2	81.3	84.5	86.7	81.9	78.3	63.5	58.4	70.6
1988	51.0	57.1	65.9	73.1	78.6	83.7	86.2	81.5	86.1	74.6	67.6	58.8	72.0
NORM	53.8	58.1	65.5	73.4	78.9	83.8	86.0	85.8	81.4	73.3	63.3	56.2	71.6

L.V.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	63.9	64.6	70.9	73.3	79.4	82.7	83.2	82.8	80.2	76.9	68.9	65.5	74.4
1972	64.5	62.7	72.6	77.8	77.5	81.4	82.3	83.6	83.6	77.9	62.8	58.5	73.8
1973	52.9	57.6	70.8	72.2	78.5	81.7	83.8	82.3	82.0	76.8	74.3	61.8	72.9
1974	60.0	63.5	73.0	75.3	81.7	81.8	82.5	85.5	79.8	73.5	65.6	58.9	73.4
1975	60.6	63.0	71.3	76.2	81.5	82.6	82.3	82.7	78.5	74.4	67.0	60.0	73.3
1976	57.6	65.3	70.1	74.0	75.9	82.3	81.0	82.7	81.3	68.1	58.9	55.3	71.0
1977	52.3	59.7	68.2	72.8	79.6	83.3	84.2	85.9	84.0	76.7	69.6	62.5	73.2
1978	52.6	54.1	66.1	74.3	81.8	83.9	86.1	85.1	81.7	74.1	69.1	60.7	72.5
1979	54.4	58.2	68.8	76.0	77.2	81.8	86.0	84.8	78.1	76.8	65.2	58.7	72.2
1980	61.7	59.2	68.6	72.0	80.9	86.2	87.4	85.0	84.2	73.2	61.9	60.1	73.4
1981	57.6	61.5	67.4	76.6	79.2	83.8	85.0	85.4	81.9	76.8	70.1	62.5	74.0
1982	60.8	59.1	69.8	74.4	78.4	84.7	86.3	86.0	83.0	75.5	67.4	61.1	73.9
1983	57.4	62.0	68.0	72.4	79.0	83.6	84.5	85.3	81.6	75.8	70.7	53.3	72.8
1984	53.6	62.0	69.9	76.8	79.1	82.8	84.2	84.8	78.9	78.1	67.9	68.3	73.9
1985	52.9	57.4	70.7	75.2	79.8	82.7	83.2	85.4	83.3	76.5	72.5	58.9	73.2
1986	60.1	65.1	69.4	77.7	79.5	83.7	85.6	85.6	84.5	76.5	66.3	58.5	74.4
1987	57.8	62.8	64.0	69.7	79.3	82.3	84.4	85.9	82.9	74.9	67.4	63.5	72.9
1988	54.0	59.9	67.2	73.8	78.5	82.3	86.1	81.1	85.2	76.5	71.8	62.9	73.3
NORM	58.7	62.1	68.4	75.1	79.6	83.2	84.8	84.9	82.0	74.0	67.5	61.4	73.6

PRECIPITATION DATA FOR THE HIGH PLAINS (TOP) AND LOW ROLLING PLAINS (BOTTOM)

H.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.11	0.94	0.06	1.02	1.81	2.04	2.29	3.46	4.26	1.98	1.83	0.83	20.63
1972	0.12	0.10	0.11	0.32	3.17	3.01	3.22	3.56	2.48	1.91	1.45	0.31	19.76
1973	1.02	0.93	3.43	2.26	1.33	0.83	3.44	1.30	2.12	0.90	0.16	0.31	18.03
1974	0.35	0.14	1.18	0.63	1.19	1.78	0.76	5.82	3.77	3.80	0.43	0.53	20.38
1975	0.53	1.28	0.34	1.09	2.96	2.81	4.15	1.74	1.77	0.12	1.35	0.28	18.42
1976	0.04	0.08	0.56	2.36	1.70	1.46	2.79	1.61	3.21	1.21	0.42	0.02	15.46
1977	0.39	0.34	0.54	2.92	4.11	1.94	1.47	3.98	0.78	0.66	0.23	0.09	17.65
1978	0.47	1.13	0.22	0.35	4.69	3.19	1.03	1.75	3.12	0.80	1.43	0.25	18.43
1979	0.77	0.40	1.55	1.13	3.17	4.10	3.31	2.92	0.70	1.21	0.34	0.66	20.26
1980	0.85	0.61	0.98	1.49	3.55	1.61	0.53	1.99	3.38	0.43	1.06	0.66	17.14
1981	0.22	0.35	1.42	1.60	2.00	1.75	2.88	4.62	2.76	3.10	0.97	0.14	21.81
1982	0.22	0.51	0.69	0.68	4.05	4.67	4.24	0.92	1.24	0.48	0.89	1.29	19.88
1983	1.55	1.07	0.72	0.83	2.13	2.24	0.60	0.54	0.74	3.82	0.79	0.56	15.59
1984	0.31	0.33	0.95	0.93	1.06	3.64	1.49	3.32	0.98	2.86	1.43	1.51	18.81
1985	0.57	0.99	1.93	1.62	2.41	4.50	1.99	1.60	4.91	3.97	0.33	0.20	25.02
1986	0.01	0.87	0.29	0.66	2.86	4.52	1.67	4.46	3.72	3.45	2.06	1.42	25.99
1987	0.71	1.34	1.15	0.42	5.15	2.80	1.68	3.36	3.35	0.69	0.34	1.43	22.42
1988	0.35	0.26	1.36	2.26	3.39	2.51	3.71	4.05	1.80	0.18	0.16	0.27	20.30
NORM	0.53	0.61	0.84	1.25	2.83	2.75	2.56	2.43	2.16	1.80	0.68	0.61	19.00

L.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.04	0.41	0.05	1.32	3.03	1.91	1.88	6.76	5.12	3.44	0.50	1.58	26.27
1972	0.13	0.23	0.36	1.38	3.52	2.52	1.91	5.13	3.29	4.49	1.29	0.16	24.41
1973	2.37	1.54	3.55	2.71	1.28	2.57	3.18	0.87	5.30	1.88	0.43	0.03	25.71
1974	0.16	0.28	1.03	1.99	2.53	2.26	0.54	3.68	6.83	4.49	0.70	1.03	25.52
1975	0.84	1.91	0.60	1.02	4.57	2.46	4.34	2.52	3.31	0.69	2.15	1.02	25.43
1976	0.00	0.06	0.69	4.11	1.59	1.18	3.84	1.57	3.58	4.66	0.42	0.10	21.80
1977	0.93	0.90	1.28	3.93	3.93	2.08	1.38	3.07	0.38	1.24	0.41	0.07	19.60
1978	0.45	1.71	0.40	0.59	4.95	2.46	0.76	3.87	4.67	0.95	1.28	0.34	22.43
1979	1.07	0.76	3.12	1.50	3.06	4.59	3.31	3.20	0.35	0.72	0.71	1.64	24.03
1980	0.89	0.65	0.76	0.80	5.55	1.64	0.16	1.23	8.19	0.49	1.44	1.39	23.19
1981	0.36	1.24	1.70	3.17	3.37	2.72	1.28	2.44	1.35	4.76	0.56	0.24	23.19
1982	1.00	0.71	1.03	1.00	8.37	6.47	1.43	1.32	1.33	0.67	1.75	1.38	26.46
1983	2.10	0.92	1.59	1.19	3.13	2.56	0.86	0.42	0.69	6.75	1.36	0.63	22.20
1984	0.48	0.81	0.86	0.48	0.82	2.01	1.35	2.73	1.43	3.23	2.48	3.41	20.09
1985	0.50	1.81	2.63	2.82	2.56	5.06	2.16	1.29	3.32	3.96	0.72	0.18	27.01
1986	0.01	1.25	0.50	1.61	3.94	3.95	2.23	3.86	5.11	6.90	1.99	1.46	32.81
1987	0.98	2.89	1.31	0.41	7.14	2.85	1.76	2.64	2.57	0.36	0.44	2.28	25.63
1988	0.44	0.30	1.35	1.90	1.36	3.50	3.04	5.48	0.93	0.24	0.26	0.78	19.58
NORM	0.85	1.00	1.18	2.02	3.74	2.91	2.09	2.30	2.84	2.57	1.07	1.00	23.56

PRECIPITATION DATA FOR NORTH CENTRAL (TOP) AND EAST TEXAS (BOTTOM)

N.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.25	1.61	0.35	2.13	3.42	1.47	4.71	4.06	3.28	6.31	1.82	5.26	34.67
1972	1.47	0.45	0.53	2.95	3.01	2.18	1.94	2.37	2.95	5.56	2.48	0.85	26.74
1973	3.70	2.32	3.43	5.17	2.86	5.79	4.89	0.49	5.81	6.57	1.77	0.74	43.54
1974	1.54	1.11	1.03	2.64	2.94	2.76	1.20	6.26	7.03	6.13	3.20	1.88	37.72
1975	1.49	3.19	2.03	3.19	6.96	3.08	3.14	2.08	2.06	0.95	1.32	1.58	31.07
1976	0.24	0.66	2.36	6.16	5.08	2.73	4.44	1.60	4.60	5.11	0.89	1.99	35.86
1977	2.25	2.10	4.92	4.93	1.91	1.98	1.12	2.31	1.22	1.26	2.00	0.42	26.42
1978	1.39	3.01	2.15	1.87	4.22	1.59	0.86	3.27	2.07	1.00	4.51	1.23	27.17
1979	2.97	2.39	5.34	2.79	7.30	2.44	2.90	3.71	1.57	2.14	0.64	3.35	37.54
1980	2.00	1.50	1.67	2.35	5.44	1.39	0.34	0.50	6.48	1.45	2.00	2.03	27.15
1981	0.75	1.45	3.75	2.44	5.20	7.23	1.80	1.70	3.00	10.7	1.98	0.33	40.30
1982	1.84	1.77	2.16	2.65	9.33	5.69	1.90	1.08	0.79	2.09	3.95	2.98	36.23
1983	1.40	2.58	3.59	0.65	5.81	3.05	1.63	2.56	1.15	2.79	2.22	0.92	28.35
1984	1.14	1.89	3.58	0.99	2.47	2.68	1.46	1.61	1.47	8.18	2.67	4.80	32.94
1985	1.33	2.32	3.83	3.42	3.31	4.20	1.93	0.59	3.52	6.02	3.04	1.61	35.12
1986	0.14	3.47	1.00	3.28	6.64	6.14	1.31	2.22	4.92	5.06	3.50	3.24	40.92
1987	1.54	3.93	1.84	0.69	7.08	5.54	1.68	1.36	3.34	0.77	3.90	3.77	35.44
1988	0.55	1.28	2.18	1.83	2.03	4.08	2.68	4.09	0.94	1.64	1.72	2.25	25.27
NORM	1.75	2.22	2.32	3.54	4.68	3.33	2.11	2.17	3.28	3.41	2.27	2.07	33.14

E.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.52	2.89	1.24	1.91	4.06	1.62	4.44	3.53	3.33	3.84	3.39	7.21	37.98
1972	5.06	0.79	3.14	3.26	3.31	3.84	3.86	2.90	4.69	6.18	4.54	3.79	45.36
1973	5.04	3.18	7.06	7.53	3.50	9.17	4.45	2.70	8.08	8.28	4.39	4.81	68.19
1974	7.32	1.64	2.31	3.58	4.01	3.93	2.12	6.40	8.47	4.59	7.17	3.58	55.12
1975	2.65	5.13	3.49	4.73	7.59	5.09	2.65	2.66	2.00	3.25	2.49	2.38	44.11
1976	1.95	1.89	5.61	4.95	6.45	5.75	4.42	1.55	4.81	3.80	1.91	4.56	47.65
1977	3.22	3.44	5.08	4.79	1.50	3.79	1.84	4.10	2.92	1.19	4.83	2.23	38.93
1978	5.04	2.90	2.68	1.51	3.11	2.77	2.23	2.07	3.76	1.25	6.22	3.71	37.25
1979	6.94	4.28	5.85	6.09	7.27	3.28	6.71	3.38	6.73	3.05	2.85	4.15	60.58
1980	4.00	2.33	4.08	4.29	5.72	1.99	1.91	1.03	4.23	2.09	3.20	1.21	38.08
1981	1.65	2.43	3.07	1.96	7.98	7.47	3.94	2.03	3.35	7.73	2.39	0.73	44.73
1982	2.67	2.34	2.59	5.33	5.51	5.59	1.97	1.74	1.44	4.47	6.66	8.11	48.42
1983	1.48	5.45	4.79	1.04	8.12	4.12	2.43	4.54	2.72	1.97	3.81	4.53	44.92
1984	2.06	4.26	3.96	1.22	3.98	2.96	2.28	1.96	2.55	12.3	3.95	3.48	44.91
1985	2.77	4.32	3.92	3.65	3.41	1.94	3.48	1.03	3.14	8.02	6.92	3.72	46.32
1986	0.62	3.46	1.02	5.34	6.92	7.55	1.00	2.69	4.47	5.01	6.41	4.73	49.22
1987	2.07	5.63	2.77	0.55	4.88	6.16	2.98	1.67	3.45	2.00	7.62	7.89	47.67
1988	1.49	2.46	4.47	2.21	0.96	1.73	3.64	1.72	2.83	3.45	4.75	4.39	34.10
NORM	3.45	3.56	3.57	4.42	5.18	3.89	3.06	2.75	3.81	3.82	4.08	4.10	45.68

PRECIPITATION DATA FOR THE TRANS PECOS (TOP) AND EDWARDS PLATEAU (BOTTOM)

T.P	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.05	0.01	0.00	0.35	0.54	0.77	1.59	3.37	2.05	2.30	0.07	0.31	11.41
1972	0.25	0.05	0.10	0.06	1.89	2.01	1.21	3.24	3.15	1.48	0.34	0.08	13.86
1973	0.71	1.52	0.50	0.23	0.60	0.56	4.05	0.83	1.60	0.65	0.01	0.00	11.26
1974	0.54	0.02	0.37	0.78	0.64	0.47	1.21	3.19	8.15	2.77	0.88	0.72	19.74
1975	0.60	0.79	0.09	0.05	1.06	0.59	3.15	1.71	2.44	0.40	0.32	0.55	11.75
1976	0.15	0.13	0.09	0.56	1.61	1.21	3.58	0.96	2.87	1.57	0.68	0.51	13.92
1977	0.40	0.12	0.43	0.70	0.97	1.37	1.50	0.82	0.54	1.87	0.28	0.19	9.19
1978	0.35	0.45	0.08	0.32	1.40	2.11	1.32	2.70	6.17	1.79	1.76	0.38	18.83
1979	0.39	0.63	0.12	0.36	1.07	1.88	1.94	3.04	0.95	0.07	0.09	0.75	11.29
1980	0.34	0.27	0.04	0.22	0.90	1.04	0.36	2.97	5.45	0.68	1.00	0.50	13.77
1981	1.10	0.34	0.77	2.57	1.53	1.48	1.92	2.70	1.98	3.38	0.03	0.01	17.81
1982	0.49	0.32	0.01	0.69	2.11	1.84	1.41	0.93	0.80	0.26	0.69	1.63	11.18
1983	0.84	0.47	0.46	0.43	0.75	0.90	0.70	0.90	1.11	2.74	0.89	0.09	10.28
1984	0.65	0.04	0.11	0.00	1.69	3.47	0.97	2.04	1.45	2.69	1.16	1.28	15.55
1985	0.84	0.51	0.52	0.29	0.88	1.90	1.60	1.29	3.24	1.63	0.28	0.01	12.99
1986	0.40	0.32	0.14	0.27	1.21	3.76	1.56	3.17	2.43	4.02	1.02	2.41	20.71
1987	0.18	1.02	0.52	1.61	2.42	2.28	1.40	3.15	1.54	0.55	0.22	0.74	15.63
1988	0.04	0.26	0.21	0.27	1.27	1.90	1.90	3.29	2.18	0.19	0.04	0.26	12.09
NORM	0.54	0.39	0.40	0.53	1.14	1.48	1.78	1.85	2.05	1.32	0.47	0.52	12.46

E.P.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.01	0.74	0.08	2.14	1.46	2.91	2.63	8.36	3.60	4.23	0.50	1.23	27.89
1972	0.74	0.25	0.44	1.46	4.83	2.39	1.30	5.03	3.42	2.55	0.87	0.19	23.47
1973	1.94	2.13	1.60	2.01	1.12	3.92	4.45	0.55	3.81	5.02	0.21	0.08	26.84
1974	0.58	0.17	0.97	1.73	3.58	0.95	0.67	7.62	6.80	4.44	1.61	1.74	30.86
1975	0.63	2.19	0.36	2.04	6.08	2.08	3.12	1.97	2.31	2.06	1.35	0.71	24.90
1976	0.09	0.14	0.87	4.06	2.88	1.81	7.81	1.16	4.40	4.75	0.84	1.11	29.92
1977	1.26	0.73	1.69	4.83	1.98	2.24	0.38	0.91	0.70	2.25	1.81	0.18	18.96
1978	0.58	1.46	0.42	1.22	2.88	2.90	1.04	4.23	4.07	1.09	2.77	0.77	23.43
1979	1.04	1.82	2.95	1.98	1.80	3.96	1.96	2.87	0.27	0.47	0.63	1.93	21.68
1980	0.88	0.70	0.96	0.94	4.40	1.60	0.35	2.39	7.51	0.79	2.27	1.33	24.12
1981	1.01	0.63	3.16	4.25	3.71	5.45	1.14	2.58	1.96	6.50	0.45	0.11	30.95
1982	0.71	1.71	0.66	1.58	4.53	3.25	0.93	1.03	1.35	0.85	2.21	1.48	20.29
1983	1.55	1.36	1.93	0.38	2.53	3.34	1.14	1.24	0.90	3.81	1.83	0.19	20.20
1984	1.56	0.37	0.61	0.24	1.42	1.60	1.38	0.77	2.06	4.88	1.69	3.74	20.32
1985	1.28	1.19	1.89	1.46	2.85	3.28	1.82	0.67	3.56	3.13	1.43	0.40	22.96
1986	0.52	1.17	0.35	0.78	5.05	4.57	0.78	2.89	4.09	7.59	1.71	3.63	33.13
1987	0.48	3.12	1.51	1.39	6.32	6.27	1.49	2.40	2.73	0.38	1.53	1.65	29.27
1988	0.15	0.45	0.67	0.75	2.98	2.26	3.93	3.44	1.20	0.64	0.21	0.78	17.46
NORM	1.11	1.41	1.29	2.23	3.21	2.65	1.72	2.31	3.15	2.72	1.28	1.18	24.27

PRECIPITATION DATA FOR SOUTH CENTRAL TX (TOP) AND THE UPPER COAST (BOTTOM)

S.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.07	1.13	0.21	1.52	2.28	2.51	0.61	7.54	9.35	4.18	1.65	3.77	34.82
1972	2.07	1.45	1.17	1.95	8.81	3.77	3.17	3.45	3.95	2.53	2.74	0.71	35.77
1973	3.36	2.76	2.58	4.73	1.47	10.7	2.76	3.46	7.53	8.82	1.01	0.71	49.88
1974	3.48	0.28	2.48	1.18	5.29	2.47	1.15	6.72	5.86	2.75	4.92	1.68	38.26
1975	1.42	1.88	0.70	3.14	7.36	4.31	3.15	3.96	3.24	2.80	1.18	1.97	35.11
1976	0.75	0.37	1.60	7.95	5.40	2.16	6.52	1.52	4.80	8.20	3.33	4.59	47.19
1977	2.67	2.10	1.25	6.37	2.76	3.16	0.65	0.91	2.71	2.38	3.43	0.51	28.90
1978	2.46	2.29	0.83	1.96	1.98	5.25	1.68	2.27	7.97	1.13	4.34	2.12	34.28
1979	4.74	2.35	2.99	4.84	5.51	3.67	5.59	2.23	5.80	0.71	1.10	2.44	41.97
1980	2.38	1.45	1.90	0.98	5.68	0.66	1.06	4.80	5.25	1.60	3.20	0.83	29.79
1981	2.14	1.49	2.02	2.35	6.49	9.25	3.04	5.66	2.00	7.23	2.07	1.00	44.74
1982	0.77	3.43	1.12	2.12	5.79	1.43	0.43	1.49	1.57	3.42	4.20	1.68	27.45
1983	1.88	3.22	4.49	0.13	4.43	3.10	5.17	2.97	4.80	3.48	2.33	0.90	36.90
1984	3.15	1.29	1.52	0.27	2.24	1.55	2.05	1.54	1.99	8.02	1.84	3.29	28.75
1985	2.71	2.68	2.95	3.76	2.64	4.73	2.05	0.53	5.32	4.37	5.66	1.18	38.58
1986	1.36	1.54	0.96	0.99	6.39	5.11	0.20	2.65	4.16	6.58	3.02	5.79	38.75
1987	1.57	4.63	0.97	0.52	6.29	10.3	2.70	1.58	2.80	0.92	3.43	2.28	38.00
1988	0.54	1.05	2.12	1.93	2.43	2.26	2.94	2.88	1.31	1.45	0.37	1.19	20.41
NORM	2.08	2.35	1.81	2.87	4.07	3.60	2.25	2.84	4.38	3.45	2.41	2.06	34.18

U.C.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.38	2.54	0.82	1.91	2.84	2.17	1.81	6.70	10.3	4.01	1.95	6.09	41.48
1972	4.14	1.61	1.96	2.23	8.42	3.08	4.89	3.39	6.95	3.73	5.80	1.76	47.96
1973	3.73	3.69	4.08	8.22	2.81	11.3	4.03	6.18	11.8	9.20	1.45	2.30	68.72
1974	6.03	1.23	3.68	2.45	8.71	2.38	2.34	6.36	5.00	3.15	7.83	3.89	53.05
1975	2.67	1.48	1.49	2.70	7.54	5.88	3.35	5.96	2.95	4.29	2.61	3.65	44.57
1976	1.45	0.54	2.22	3.88	3.63	5.60	7.51	2.48	5.93	4.90	4.80	6.82	49.76
1977	3.29	1.71	1.84	4.72	2.34	4.98	2.32	3.86	4.64	3.03	7.34	1.77	41.84
1978	5.74	3.44	0.69	1.84	0.73	5.90	3.79	2.45	6.36	0.58	5.70	2.61	39.83
1979	6.45	3.90	4.76	7.06	5.23	3.37	14.1	3.34	15.1	2.93	1.45	2.84	70.47
1980	5.46	1.84	4.90	1.23	6.30	0.99	2.41	2.46	8.68	2.93	2.08	1.33	40.61
1981	2.94	2.26	1.74	2.12	7.58	11.4	6.35	6.32	3.15	7.00	3.28	3.52	57.61
1982	1.67	4.51	1.65	3.12	6.87	3.07	1.75	2.28	1.75	3.31	8.38	5.56	43.98
1983	3.21	5.64	4.01	0.39	4.72	4.64	9.06	8.14	9.85	3.29	3.58	2.98	59.56
1984	4.39	2.42	1.53	0.37	4.78	1.51	3.69	3.76	5.46	13.3	3.08	2.66	46.98
1985	3.28	4.90	6.34	3.09	2.07	4.78	3.98	2.82	6.02	5.79	3.65	2.67	49.39
1986	1.52	2.02	1.41	1.60	5.94	8.13	1.00	3.48	5.09	9.60	7.71	6.31	53.81
1987	3.94	5.15	0.74	0.19	5.45	10.4	5.99	2.53	4.69	0.44	4.92	3.88	48.30
1988	2.10	1.64	4.39	2.80	0.96	2.51	4.10	4.66	2.80	1.62	0.70	2.73	31.03
NORM	3.36	3.22	2.62	3.18	4.60	4.65	4.28	4.40	5.66	4.17	3.75	3.63	47.54

PRECIPITATION DATA FOR SOUTHERN TEXAS (TOP) AND THE LOWER VALLEY (BOTTOM)

S	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.06	0.57	0.01	1.13	1.10	6.38	0.53	7.08	8.46	6.66	0.43	1.29	33.70
1972	1.04	1.11	0.37	0.66	4.80	3.42	1.99	1.92	4.84	0.62	1.89	0.42	23.08
1973	2.00	3.58	0.39	1.9	0.69	7.88	1.78	3.63	8.49	4.50	0.17	0.08	35.12
1974	1.02	0.09	3.16	0.77	2.60	1.49	0.89	5.67	3.80	2.48	1.11	1.01	24.09
1975	0.70	0.81	0.50	1.41	5.70	3.21	3.50	2.41	4.16	2.13	0.05	0.52	25.10
1976	0.38	0.00	0.99	4.85	3.42	1.33	7.92	1.33	3.80	6.59	3.12	2.16	35.89
1977	1.77	0.69	0.25	3.36	2.04	2.30	0.53	0.70	1.27	2.35	1.02	0.26	16.54
1978	0.57	0.57	0.04	0.85	2.98	3.62	0.95	3.90	5.18	1.99	1.28	1.38	23.31
1979	1.48	0.89	1.17	4.41	1.76	4.92	1.75	1.43	3.00	0.06	0.42	1.31	22.60
1980	0.79	0.75	0.30	0.40	5.45	0.04	0.64	6.22	2.17	0.53	3.41	0.51	21.21
1981	1.99	0.73	1.92	2.91	5.80	7.34	1.99	3.87	1.69	4.16	0.03	0.52	32.95
1982	0.26	2.63	0.34	1.81	4.55	1.17	0.42	0.87	1.15	2.43	2.10	1.39	19.12
1983	0.85	2.52	1.36	0.02	1.66	2.68	2.31	1.98	2.52	2.49	1.16	0.38	19.93
1984	2.18	0.41	0.43	0.14	2.59	1.05	1.10	0.69	2.05	4.70	1.01	1.86	18.21
1985	2.06	1.35	2.00	3.64	4.05	4.03	1.57	0.41	3.17	5.26	2.04	0.26	29.84
1986	1.08	0.76	0.24	1.37	3.94	3.56	0.35	0.81	2.32	6.01	1.41	3.73	25.58
1987	0.78	3.11	0.72	1.65	5.20	6.07	1.69	2.14	1.39	0.51	1.61	0.70	25.57
1988	0.59	0.71	0.56	0.70	1.85	1.45	2.01	3.48	1.28	2.05	0.19	0.27	15.14
NORM	1.11	1.28	0.81	1.88	3.17	2.75	1.48	2.34	3.49	2.57	1.17	0.99	23.03

L.V.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1971	0.27	0.62	0.02	1.38	1.52	2.98	1.48	3.26	9.85	3.61	0.68	1.27	26.94
1972	0.46	1.44	2.42	1.35	3.81	6.82	3.37	1.10	2.87	1.10	1.77	0.33	26.84
1973	3.98	4.57	0.15	0.76	1.05	7.71	0.84	5.01	6.43	4.02	1.48	0.44	36.44
1974	1.02	0.01	1.30	1.24	1.18	2.01	2.01	0.91	7.29	4.91	0.52	0.64	23.04
1975	1.18	0.51	0.11	0.02	3.13	2.61	7.05	5.42	7.06	1.48	0.38	1.26	30.21
1976	0.60	0.01	0.85	5.06	2.13	1.28	7.81	2.80	3.94	6.19	3.77	1.68	36.12
1977	1.45	1.95	0.09	2.81	1.28	4.29	0.76	2.04	3.70	1.79	2.13	0.12	22.41
1978	3.29	0.94	0.02	1.22	0.22	2.13	1.61	1.98	7.06	3.78	0.78	1.88	24.91
1979	1.18	1.00	0.18	4.02	1.52	3.73	0.87	4.33	5.10	0.77	0.40	3.05	26.15
1980	0.51	1.33	0.25	0.05	3.50	0.18	0.35	7.70	2.57	3.01	2.35	0.83	22.63
1981	2.66	0.78	2.60	2.57	5.36	3.16	2.46	4.25	2.02	3.91	0.62	0.32	30.71
1982	0.06	3.66	0.18	1.11	7.66	0.08	0.06	0.83	1.28	1.65	1.65	1.86	20.08
1983	0.80	4.63	1.10	0.00	1.75	2.14	5.20	1.94	4.33	2.14	1.26	0.70	25.99
1984	4.00	0.80	0.13	0.05	3.18	1.38	1.61	0.99	12.7	1.37	0.19	1.85	28.20
1985	1.63	1.42	1.03	1.25	3.95	3.65	1.61	1.36	5.56	2.71	0.67	0.94	25.78
1986	0.69	1.42	0.25	0.82	4.19	3.16	0.50	1.50	1.99	2.88	3.67	3.93	25.00
1987	2.44	2.48	0.69	0.90	3.37	5.63	2.64	0.65	4.60	1.63	2.25	0.35	27.63
1988	3.19	2.08	1.13	0.46	0.75	1.41	2.00	5.67	2.68	1.59	0.37	0.20	21.53
NORM	1.53	1.42	0.77	1.46	2.80	2.77	1.54	2.53	4.65	2.76	1.31	1.09	24.66

APPENDIX C
EVAPOTRANSPIRATION, PRECIPITATION, AND SOIL MOISTURE
DATA FOR THE TEN CLIMATIC DIVISIONS OF TEXAS

HIGH PLAINS (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.00	0.00	0.53	0.53		0.94	23.5	0.94	15.7
FEB	0.56	0.39	0.61	0.22		1.16	29.0	1.16	19.3
MAR	1.93	1.48	0.84		0.64	0.52	13.0	0.52	8.7
APR	3.51	2.63	1.25		1.38	0.00	0.0	0.00	0.0
MAY	4.75	3.56	2.83		0.73	0.00	0.0	0.00	0.0
JUN	6.28	5.02	2.75		2.77	0.00	0.0	0.00	0.0
JUL	6.68	5.34	2.56		2.78	0.00	0.0	0.00	0.0
AUG	6.45	5.16	2.43		2.73	0.00	0.0	0.00	0.0
SEP	5.29	3.97	2.16		1.81	0.00	0.0	0.00	0.0
OCT	3.63	2.72	1.80		0.92	0.00	0.0	0.00	0.0
NOV	1.63	1.22	0.68		0.54	0.00	0.0	0.00	0.0
DEC	0.28	0.20	0.61	0.41		0.41	10.3	0.41	6.8

HIGH PLAINS (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.01	0.01	0.47	0.46		0.76	19.0	0.76	12.7
FEB	0.72	0.50	0.54	0.04		0.80	20.0	0.80	13.3
MAR	2.09	1.57	0.84		0.73	0.07	1.8	0.07	1.2
APR	3.68	2.76	1.18		1.58	0.00	0.0	0.00	0.0
MAY	4.91	3.68	2.83		0.85	0.00	0.0	0.00	0.0
JUN	6.45	5.16	2.44		2.72	0.00	0.0	0.00	0.0
JUL	6.85	5.48	2.08		3.40	0.00	0.0	0.00	0.0
AUG	6.61	5.29	2.12		3.17	0.00	0.0	0.00	0.0
SEP	5.46	4.10	1.96		2.14	0.00	0.0	0.00	0.0
OCT	3.79	2.84	1.80		1.04	0.00	0.0	0.00	0.0
NOV	1.79	1.34	0.62		0.72	0.00	0.0	0.00	0.0
DEC	0.44	0.31	0.61	0.30		0.30	7.5	0.30	0.5

HIGH PLAINS (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.18	0.13	0.42	0.29		0.47	11.8	0.47	7.8
FEB	0.89	0.62	0.49		0.13	0.34	8.5	0.34	5.7
MAR	2.26	1.70	0.84		0.86	0.00	0.0	0.00	0.0
APR	3.84	2.88	1.11		1.77	0.00	0.0	0.00	0.0
MAY	5.08	3.81	2.83		0.98	0.00	0.0	0.00	0.0
JUN	6.61	5.29	2.15		3.14	0.00	0.0	0.00	0.0
JUL	7.01	5.61	1.62		3.99	0.00	0.0	0.00	0.0
AUG	6.78	5.42	1.81		3.61	0.00	0.0	0.00	0.0
SEP	5.62	4.22	1.72		2.50	0.00	0.0	0.00	0.0
OCT	3.96	2.97	1.80		1.17	0.00	0.0	0.00	0.0
NOV	1.96	1.47	0.55		0.92	0.00	0.0	0.00	0.0
DEC	0.61	0.43	0.61	0.18		0.18	4.5	0.18	3.0

HIGH PLAINS (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.34	0.24	0.37	0.13		0.20	5.0	0.20	3.3
FEB	1.05	0.74	0.43		0.31	0.00	0.0	0.00	0.0
MAR	2.42	1.82	0.84		0.98	0.00	0.0	0.00	0.0
APR	4.01	3.01	1.03		1.98	0.00	0.0	0.00	0.0
MAY	5.24	3.93	2.83		1.10	0.00	0.0	0.00	0.0
JUN	6.77	5.42	1.85		3.57	0.00	0.0	0.00	0.0
JUL	7.17	5.74	1.15		4.59	0.00	0.0	0.00	0.0
AUG	6.94	5.55	1.49		4.06	0.00	0.0	0.00	0.0
SEP	5.78	4.34	1.48		2.86	0.00	0.0	0.00	0.0
OCT	4.12	3.09	1.80		1.29	0.00	0.0	0.00	0.0
NOV	2.12	1.59	0.47		1.12	0.00	0.0	0.00	0.0
DEC	0.77	0.54	0.61	0.07		0.07	1.8	0.00	1.2

HIGH PLAINS (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.51	0.36	0.31		0.05	0.00	0.0	0.00	0.0
FEB	1.22	0.85	0.38		0.47	0.00	0.0	0.00	0.0
MAR	2.59	1.94	0.84		1.10	0.00	0.0	0.00	0.0
APR	4.17	3.13	0.96		2.17	0.00	0.0	0.00	0.0
MAY	5.41	4.06	2.83		1.23	0.00	0.0	0.00	0.0
JUN	6.94	5.55	1.55		4.00	0.00	0.0	0.00	0.0
JUL	7.34	5.87	0.69		5.18	0.00	0.0	0.00	0.0
AUG	7.11	5.69	1.17		4.52	0.00	0.0	0.00	0.0
SEP	5.95	4.46	1.25		3.21	0.00	0.0	0.00	0.0
OCT	4.29	3.22	1.80		1.42	0.00	0.0	0.00	0.0
NOV	2.29	1.72	0.40		1.32	0.00	0.0	0.00	0.0
DEC	0.94	0.66	0.61		0.05	0.00	0.0	0.00	0.0

HIGH PLAINS (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.18	0.13	0.42	0.29		0.47	11.8	0.47	7.8
FEB	0.89	0.62	0.49		0.13	0.34	8.5	0.34	5.7
MAR	2.09	1.57	0.84		0.73	0.00	0.0	0.00	0.0
APR	3.68	2.76	1.18		1.58	0.00	0.0	0.00	0.0
MAY	4.91	3.68	2.83		0.85	0.00	0.0	0.00	0.0
JUN	6.28	5.02	2.75		2.27	0.00	0.0	0.00	0.0
JUL	6.68	5.34	2.56		2.78	0.00	0.0	0.00	0.0
AUG	6.45	5.16	2.43		2.73	0.00	0.0	0.00	0.0
SEP	5.46	4.10	1.96		2.14	0.00	0.0	0.00	0.0
OCT	3.79	2.84	1.80		1.04	0.00	0.0	0.00	0.0
NOV	1.79	1.34	0.62		0.72	0.00	0.0	0.00	0.0
DEC	0.61	0.43	0.61	0.18		0.18	4.5	0.18	3.0

HIGH PLAINS (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.34	0.24	0.37	0.13		0.20	5.0	0.20	3.3
FEB	1.05	0.74	0.43		0.31	0.00	0.0	0.00	0.0
MAR	2.26	1.70	0.84		0.86	0.00	0.0	0.00	0.0
APR	3.84	2.88	1.11		1.77	0.00	0.0	0.00	0.0
MAY	5.08	3.81	2.83		0.98	0.00	0.0	0.00	0.0
JUN	6.45	5.16	2.44		2.72	0.00	0.0	0.00	0.0
JUL	6.85	5.48	2.08		3.40	0.00	0.0	0.00	0.0
AUG	6.61	5.29	2.12		3.17	0.00	0.0	0.00	0.0
SEP	5.62	4.22	1.72		2.50	0.00	0.0	0.00	0.0
OCT	3.96	2.97	1.80		1.17	0.00	0.0	0.00	0.0
NOV	1.96	1.47	0.55		0.92	0.00	0.0	0.00	0.0
DEC	0.77	0.54	0.61	0.07		0.07	1.8	0.07	1.2

HIGH PLAINS (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.51	0.36	0.31		0.05	0.00	0.0	0.00	0.0
FEB	1.22	0.85	0.38		0.47	0.00	0.0	0.00	0.0
MAR	2.42	1.82	0.84		0.98	0.00	0.0	0.00	0.0
APR	4.01	3.01	1.03		1.98	0.00	0.0	0.00	0.0
MAY	5.24	3.93	2.83		1.10	0.00	0.0	0.00	0.0
JUN	6.61	5.29	2.15		3.14	0.00	0.0	0.00	0.0
JUL	7.01	5.61	1.62		3.99	0.00	0.0	0.00	0.0
AUG	6.78	5.42	1.81		3.61	0.00	0.0	0.00	0.0
SEP	5.78	4.34	1.48		2.86	0.00	0.0	0.00	0.0
OCT	4.12	3.09	1.80		1.29	0.00	0.0	0.00	0.0
NOV	2.12	1.59	0.47		1.12	0.00	0.0	0.00	0.0
DEC	0.94	0.66	0.61		0.05	0.00	0.0	0.00	0.0

HIGH PLAINS (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.67	0.47	0.26		0.21	0.00	0.0	0.00	0.0
FEB	1.38	0.97	0.32		0.65	0.00	0.0	0.00	0.0
MAR	2.59	1.94	0.84		1.10	0.00	0.0	0.00	0.0
APR	4.17	3.13	0.96		2.17	0.00	0.0	0.00	0.0
MAY	5.41	4.06	2.83		1.23	0.00	0.0	0.00	0.0
JUN	6.77	5.42	1.85		3.57	0.00	0.0	0.00	0.0
JUL	7.17	5.74	1.15		4.59	0.00	0.0	0.00	0.0
AUG	6.94	5.55	1.49		4.06	0.00	0.0	0.00	0.0
SEP	5.95	4.46	1.25		3.21	0.00	0.0	0.00	0.0
OCT	4.29	3.22	1.80		1.42	0.00	0.0	0.00	0.0
NOV	2.29	1.72	0.40		1.32	0.00	0.0	0.00	0.0
DEC	1.10	0.88	0.61		0.27	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.28	0.90	0.85		0.05	0.00	0.0	0.00	0.0
FEB	2.14	1.50	1.00		0.50	0.00	0.0	0.00	0.0
MAR	3.51	2.63	1.18		1.45	0.00	0.0	0.00	0.0
APR	5.22	3.92	2.02		1.90	0.00	0.0	0.00	0.0
MAY	6.24	4.68	3.74		0.94	0.00	0.0	0.00	0.0
JUN	7.61	6.09	2.91		3.18	0.00	0.0	0.00	0.0
JUL	8.22	6.58	2.09		4.49	0.00	0.0	0.00	0.0
AUG	8.08	6.46	2.30		4.27	0.00	0.0	0.00	0.0
SEP	6.96	5.22	2.84		2.38	0.00	0.0	0.00	0.0
OCT	5.21	3.91	2.57		1.34	0.00	0.0	0.00	0.0
NOV	3.27	2.45	1.07		1.38	0.00	0.0	0.00	0.0
DEC	1.87	1.31	1.00		0.31	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.44	1.01	0.85		0.16	0.00	0.0	0.00	0.0
FEB	2.30	1.61	0.93		0.68	0.00	0.0	0.00	0.0
MAR	3.67	2.75	1.18		1.57	0.00	0.0	0.00	0.0
APR	5.38	4.04	2.02		2.32	0.00	0.0	0.00	0.0
MAY	6.40	4.80	3.74		1.06	0.00	0.0	0.00	0.0
JUN	7.77	6.22	2.53		3.69	0.00	0.0	0.00	0.0
JUL	8.38	6.70	1.61		5.09	0.00	0.0	0.00	0.0
AUG	8.24	6.59	1.83		4.76	0.00	0.0	0.00	0.0
SEP	7.12	5.34	2.42		2.92	0.00	0.0	0.00	0.0
OCT	5.37	4.03	2.57		1.80	0.00	0.0	0.00	0.0
NOV	3.43	2.57	1.01		1.56	0.00	0.0	0.00	0.0
DEC	1.98	1.39	1.00		0.39	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.61	1.13	0.85		0.28	0.00	0.0	0.00	0.0
FEB	2.47	1.73	0.86		0.87	0.00	0.0	0.00	0.0
MAR	3.89	2.92	1.18		1.74	0.00	0.0	0.00	0.0
APR	5.55	4.16	2.02		2.14	0.00	0.0	0.00	0.0
MAY	6.58	4.94	3.74		1.20	0.00	0.0	0.00	0.0
JUN	7.94	6.22	2.16		4.06	0.00	0.0	0.00	0.0
JUL	8.56	6.70	1.15		5.55	0.00	0.0	0.00	0.0
AUG	8.41	6.59	1.42		5.17	0.00	0.0	0.00	0.0
SEP	7.28	5.46	2.05		3.41	0.00	0.0	0.00	0.0
OCT	5.53	4.15	2.57		2.20	0.00	0.0	0.00	0.0
NOV	3.61	2.71	0.93		1.78	0.00	0.0	0.00	0.0
DEC	2.15	1.51	1.00		0.51	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.77	1.24	0.85		0.39	0.00	0.0	0.00	0.0
FEB	2.63	1.84	0.80		1.04	0.00	0.0	0.00	0.0
MAR	4.00	3.00	1.18		1.82	0.00	0.0	0.00	0.0
APR	5.71	4.28	2.02		2.26	0.00	0.0	0.00	0.0
MAY	6.73	5.05	3.74		1.31	0.00	0.0	0.00	0.0
JUN	8.10	6.48	1.79		4.69	0.00	0.0	0.00	0.0
JUL	8.71	6.97	0.69		6.28	0.00	0.0	0.00	0.0
AUG	8.57	6.86	1.00		5.86	0.00	0.0	0.00	0.0
SEP	7.45	5.59	1.68		3.91	0.00	0.0	0.00	0.0
OCT	5.70	4.28	2.57		2.61	0.00	0.0	0.00	0.0
NOV	3.76	2.82	0.85		1.97	0.00	0.0	0.00	0.0
DEC	2.32	1.62	1.00		0.62	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.94	1.36	0.85		0.51	0.00	0.0	0.00	0.0
FEB	2.80	1.96	0.73		1.23	0.00	0.0	0.00	0.0
MAR	4.17	3.13	1.18		1.95	0.00	0.0	0.00	0.0
APR	5.88	4.41	2.02		2.39	0.00	0.0	0.00	0.0
MAY	6.90	5.18	3.74		1.44	0.00	0.0	0.00	0.0
JUN	8.27	6.62	1.42		5.20	0.00	0.0	0.00	0.0
JUL	8.88	7.10	0.04		7.06	0.00	0.0	0.00	0.0
AUG	8.74	6.99	0.59		6.40	0.00	0.0	0.00	0.0
SEP	7.62	5.72	1.31		4.41	0.00	0.0	0.00	0.0
OCT	5.87	4.40	2.57		3.01	0.00	0.0	0.00	0.0
NOV	3.93	2.95	0.76		2.09	0.00	0.0	0.00	0.0
DEC	2.48	1.74	1.00		0.74	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.61	1.13	0.85		0.28	0.00	0.0	0.00	0.0
FEB	2.47	1.73	0.86		0.55	0.00	0.0	0.00	0.0
MAR	3.67	2.75	1.18		1.57	0.00	0.0	0.00	0.0
APR	5.38	4.04	2.02		2.02	0.00	0.0	0.00	0.0
MAY	6.40	4.80	3.74		1.06	0.00	0.0	0.00	0.0
JUN	7.61	6.09	2.91		3.18	0.00	0.0	0.00	0.0
JUL	8.22	6.58	2.09		4.49	0.00	0.0	0.00	0.0
AUG	8.08	6.46	2.30		4.16	0.00	0.0	0.00	0.0
SEP	7.12	5.34	2.42		2.92	0.00	0.0	0.00	0.0
OCT	5.37	4.03	2.57		1.46	0.00	0.0	0.00	0.0
NOV	3.43	2.57	1.01		1.56	0.00	0.0	0.00	0.0
DEC	2.15	1.51	1.00		0.51	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.77	1.24	0.85		0.39	0.00	0.0	0.00	0.0
FEB	2.63	1.84	0.80		1.04	0.00	0.0	0.00	0.0
MAR	3.89	2.92	1.18		1.74	0.00	0.0	0.00	0.0
APR	5.55	4.16	2.02		2.14	0.00	0.0	0.00	0.0
MAY	6.58	4.94	3.74		1.20	0.00	0.0	0.00	0.0
JUN	7.78	6.22	2.53		3.69	0.00	0.0	0.00	0.0
JUL	8.39	6.71	1.61		5.09	0.00	0.0	0.00	0.0
AUG	8.24	6.59	1.83		4.76	0.00	0.0	0.00	0.0
SEP	7.28	5.46	2.05		3.41	0.00	0.0	0.00	0.0
OCT	5.53	4.15	2.57		2.20	0.00	0.0	0.00	0.0
NOV	3.61	2.71	0.93		1.78	0.00	0.0	0.00	0.0
DEC	2.32	1.62	1.00		0.62	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.94	1.36	0.85		0.51	0.00	0.0	0.00	0.0
FEB	2.80	1.96	0.73		1.23	0.00	0.0	0.00	0.0
MAR	4.00	3.00	1.18		1.82	0.00	0.0	0.00	0.0
APR	5.71	4.28	2.02		2.26	0.00	0.0	0.00	0.0
MAY	6.73	5.05	3.74		1.31	0.00	0.0	0.00	0.0
JUN	7.94	6.22	2.16		4.06	0.00	0.0	0.00	0.0
JUL	8.56	6.70	1.15		5.55	0.00	0.0	0.00	0.0
AUG	8.41	6.59	1.42		5.17	0.00	0.0	0.00	0.0
SEP	7.45	5.59	1.68		3.91	0.00	0.0	0.00	0.0
OCT	5.70	4.28	2.57		1.61	0.00	0.0	0.00	0.0
NOV	3.76	2.82	0.85		1.97	0.00	0.0	0.00	0.0
DEC	2.48	1.74	1.00		0.74	0.00	0.0	0.00	0.0

LOW ROLLING PLAINS (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.10	1.47	0.85		0.62	0.00	0.0	0.00	0.0
FEB	2.96	2.07	0.67		2.03	0.00	0.0	0.00	0.0
MAR	4.17	3.13	1.18		1.95	0.00	0.0	0.00	0.0
APR	5.88	4.41	2.02		2.39	0.00	0.0	0.00	0.0
MAY	6.90	5.18	3.74		1.44	0.00	0.0	0.00	0.0
JUN	8.10	6.48	1.79		4.69	0.00	0.0	0.00	0.0
JUL	8.71	6.97	0.69		6.28	0.00	0.0	0.00	0.0
AUG	8.57	6.86	1.00		5.86	0.00	0.0	0.00	0.0
SEP	7.62	5.72	1.31		4.41	0.00	0.0	0.00	0.0
OCT	5.87	4.40	2.57		1.83	0.00	0.0	0.00	0.0
NOV	3.93	2.95	0.76		2.19	0.00	0.0	0.00	0.0
DEC	2.65	1.86	1.00		0.86	0.00	0.0	0.00	0.0

NORTH CENTRAL (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.11	0.78	1.75	0.97		1.84	46.0	1.84	30.7
FEB	1.91	1.34	2.22	0.88		2.72	68.0	2.72	45.3
MAR	3.19	2.39	2.32		0.07	2.65	66.3	2.65	44.2
APR	4.69	3.52	3.54	0.02		2.67	66.8	2.67	44.5
MAY	5.76	4.32	4.68		0.36	2.31	57.8	2.31	38.5
JUN	6.98	5.58	3.33		2.25	0.05	1.3	0.05	0.8
JUL	7.64	6.11	2.11		4.00	0.00	0.0	0.00	0.0
AUG	7.59	6.07	2.17		3.90	0.00	0.0	0.00	0.0
SEP	6.60	4.95	3.28		1.67	0.00	0.0	0.00	0.0
OCT	5.04	3.78	3.41		0.37	0.00	0.0	0.00	0.0
NOV	3.09	2.32	2.27		0.05	0.00	0.0	0.00	0.0
DEC	1.72	1.20	2.07	0.87		0.87	21.8	0.87	14.5

NORTH CENTRAL (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.27	0.89	1.75	0.86		1.61	40.3	1.61	26.8
FEB	2.07	1.45	2.22	0.77		2.38	59.5	2.38	39.7
MAR	3.35	2.51	2.32		0.19	2.19	54.8	2.19	36.5
APR	4.85	3.64	3.54		0.10	2.09	52.3	2.09	34.8
MAY	5.92	4.44	4.36		0.08	2.01	50.3	2.01	33.5
JUN	7.14	5.71	2.77		2.94	0.00	0.0	0.00	0.0
JUL	7.80	6.24	1.71		4.53	0.00	0.0	0.00	0.0
AUG	7.75	6.20	1.83		4.37	0.00	0.0	0.00	0.0
SEP	6.76	5.07	2.97		2.10	0.00	0.0	0.00	0.0
OCT	5.20	3.90	3.41		0.49	0.00	0.0	0.00	0.0
NOV	3.25	2.44	2.27		0.17	0.00	0.0	0.00	0.0
DEC	1.88	1.32	2.07	0.75		0.75	18.8	0.75	12.5

NORTH CENTRAL (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.43	1.00	1.75	0.75		1.39	34.8	1.39	23.2
FEB	2.23	1.56	2.22	0.66		2.05	51.3	2.05	34.2
MAR	3.51	2.63	2.32		0.31	1.74	43.5	1.74	29.0
APR	5.01	3.76	3.54		0.22	1.52	38.0	1.52	25.3
MAY	6.08	4.56	4.08		0.48	1.04	26.0	1.04	17.3
JUN	7.30	5.84	2.27		3.57	0.00	0.0	0.00	0.0
JUL	7.96	6.37	1.27		5.10	0.00	0.0	0.00	0.0
AUG	7.91	6.33	1.49		4.84	0.00	0.0	0.00	0.0
SEP	6.92	5.19	2.67		2.52	0.00	0.0	0.00	0.0
OCT	5.36	4.02	3.41		0.61	0.00	0.0	0.00	0.0
NOV	3.41	2.56	2.27		0.29	0.00	0.0	0.00	0.0
DEC	2.04	1.43	2.07	0.64		0.64	16.0	0.64	10.7

NORTH CENTRAL (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.59	1.11	1.75	0.64		1.17	29.3	1.17	19.5
FEB	2.39	1.67	2.22	0.55		1.72	43.0	1.72	28.7
MAR	3.67	2.75	2.32		0.43	1.29	32.3	1.29	21.5
APR	5.17	3.88	3.54		0.34	0.95	23.8	0.95	15.8
MAY	6.24	4.68	3.80		0.88	0.07	1.8	0.07	1.2
JUN	7.48	5.98	1.76		4.22	0.00	0.0	0.00	0.0
JUL	8.12	6.50	0.84		5.66	0.00	0.0	0.00	0.0
AUG	8.07	6.46	1.14		5.32	0.00	0.0	0.00	0.0
SEP	7.10	5.33	1.91		3.42	0.00	0.0	0.00	0.0
OCT	5.52	4.14	3.41		0.73	0.00	0.0	0.00	0.0
NOV	3.57	2.68	2.27		0.41	0.00	0.0	0.00	0.0
DEC	2.20	1.54	2.07	0.53		0.53	13.3	0.53	8.8

NORTH CENTRAL (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.75	1.23	1.75	0.52		0.94	23.5	0.94	15.7
FEB	2.55	1.79	2.22	0.43		1.37	34.3	1.37	22.8
MAR	3.83	2.87	2.32		0.55	0.82	20.5	0.82	13.7
APR	5.33	4.00	3.54		0.46	0.36	9.0	0.36	6.0
MAY	6.40	4.80	3.52		1.28	0.00	0.0	0.00	0.0
JUN	7.62	6.10	1.25		4.85	0.00	0.0	0.00	0.0
JUL	8.28	6.62	0.40		6.22	0.00	0.0	0.00	0.0
AUG	8.23	6.58	0.80		5.78	0.00	0.0	0.00	0.0
SEP	7.24	5.43	2.09		3.34	0.00	0.0	0.00	0.0
OCT	5.68	4.26	3.41		0.85	0.00	0.0	0.00	0.0
NOV	3.73	2.80	2.27		0.53	0.00	0.0	0.00	0.0
DEC	2.36	1.65	2.07	0.42		0.42	10.5	0.42	7.0

NORTH CENTRAL (+ 1°F NGN-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.43	1.00	1.75	0.75		1.39	34.8	1.39	23.2
FEB	2.23	1.56	2.22	0.66		2.05	51.3	2.05	34.2
MAR	3.35	2.51	2.32		0.19	1.86	46.5	1.86	31.0
APR	4.85	3.64	3.54		0.10	1.76	44.0	1.76	28.0
MAY	5.92	4.44	4.36		0.08	1.68	42.0	1.68	28.0
JUN	6.98	5.58	3.33		2.25	0.00	0.0	0.00	0.0
JUL	7.64	6.11	2.11		4.00	0.00	0.0	0.00	0.0
AUG	7.59	6.07	2.17		3.90	0.00	0.0	0.00	0.0
SEP	6.76	5.07	2.97		2.10	0.00	0.0	0.00	0.0
OCT	5.20	3.90	3.41		0.49	0.00	0.0	0.00	0.0
NOV	3.25	2.44	2.27		0.17	0.00	0.0	0.00	0.0
DEC	2.04	1.43	2.07	0.64		0.64	16.0	0.64	10.7

NORTH CENTRAL (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.59	1.11	1.75	0.64		1.17	29.3	1.17	19.5
FEB	2.39	1.67	2.22	0.55		1.72	43.0	1.72	28.7
MAR	3.51	2.63	2.32		0.31	1.41	35.3	1.41	23.5
APR	5.01	3.76	3.54		0.22	1.19	29.8	1.19	19.8
MAY	6.08	4.56	4.08		0.48	0.71	17.8	0.71	11.8
JUN	7.14	5.71	2.77		2.94	0.00	0.0	0.00	0.0
JUL	7.80	6.24	1.71		4.53	0.00	0.0	0.00	0.0
AUG	7.75	6.20	1.83		4.37	0.00	0.0	0.00	0.0
SEP	6.92	5.19	2.67		2.52	0.00	0.0	0.00	0.0
OCT	5.36	4.02	3.41		0.61	0.00	0.0	0.00	0.0
NOV	3.41	2.56	2.27		0.29	0.00	0.0	0.00	0.0
DEC	2.20	1.54	2.07	0.53		0.53	13.3	0.53	8.8

NORTH CENTRAL (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.75	1.23	1.75	0.52		0.94	23.5	0.94	15.7
FEB	2.55	1.79	2.22	0.43		1.37	34.3	1.37	22.8
MAR	3.67	2.75	2.32		0.43	0.94	23.5	0.94	15.7
APR	5.17	3.88	3.54		0.34	0.60	15.0	0.60	10.0
MAY	6.24	4.68	3.80		0.88	0.00	0.0	0.00	0.0
JUN	7.30	5.84	2.27		3.57	0.00	0.0	0.00	0.0
JUL	7.96	6.37	1.27		5.10	0.00	0.0	0.00	0.0
AUG	7.91	6.33	1.49		4.84	0.00	0.0	0.00	0.0
SEP	7.10	5.33	1.91		3.42	0.00	0.0	0.00	0.0
OCT	5.52	4.14	3.41		0.73	0.00	0.0	0.00	0.0
NOV	3.57	2.68	2.27		0.41	0.00	0.0	0.00	0.0
DEC	2.36	1.65	2.07	0.42		0.42	10.5	0.42	7.0

NORTH CENTRAL (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.91	1.34	1.75	0.41		0.72	18.0	0.72	12.0
FEB	2.71	1.90	2.22	0.32		1.04	26.0	1.04	17.3
MAR	3.83	2.87	2.32		0.55	0.49	12.3	0.49	8.2
APR	5.33	4.00	3.54		0.46	0.03	0.8	0.03	0.5
MAY	6.40	4.80	3.52		1.28	0.00	0.0	0.00	0.0
JUN	7.48	5.98	1.76		4.22	0.00	0.0	0.00	0.0
JUL	8.12	6.50	0.84		5.66	0.00	0.0	0.00	0.0
AUG	8.07	6.46	1.14		5.32	0.00	0.0	0.00	0.0
SEP	7.24	5.43	2.09		3.34	0.00	0.0	0.00	0.0
OCT	5.68	4.26	3.41		0.85	0.00	0.0	0.00	0.0
NOV	3.73	2.80	2.27		0.53	0.00	0.0	0.00	0.0
DEC	2.52	1.76	2.07	0.31		0.31	7.8	0.31	5.2

EAST TEXAS (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.70	1.19	3.45	2.26		4.00	100.0	6.00	100.0
FEB	2.13	1.49	3.56	2.07		4.00	100.0	6.00	100.0
MAR	2.97	2.23	3.57	1.34		4.00	100.0	6.00	100.0
APR	3.89	2.92	4.42	1.50		4.00	100.0	6.00	100.0
MAY	4.60	3.45	5.18	1.73		4.00	100.0	6.00	100.0
JUN	5.27	4.22	3.89		0.33	3.67	91.8	5.67	94.5
JUL	6.00	4.80	3.06		1.74	1.93	48.3	3.93	65.5
AUG	5.66	4.53	2.75		1.78	0.15	3.8	2.15	35.8
SEP	5.11	3.83	3.81		0.02	0.13	3.3	2.13	35.3
OCT	4.15	3.11	3.82	0.71		0.84	21.0	2.97	49.5
NOV	2.94	2.21	4.08	1.87		2.71	67.8	5.68	94.7
DEC	2.03	1.42	4.10	2.68		4.00	100.0	6.00	100.0

EAST TEXAS (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.81	1.27	3.45	2.18		4.00	100.0	6.00	100.0
FEB	2.24	1.57	3.56	1.99		4.00	100.0	6.00	100.0
MAR	2.97	2.23	3.57	1.34		4.00	100.0	6.00	100.0
APR	4.00	3.00	4.42	1.42		4.00	100.0	6.00	100.0
MAY	4.71	3.53	5.18	1.65		4.00	100.0	6.00	100.0
JUN	5.38	4.30	3.38		0.92	3.08	77.0	5.08	84.7
JUL	6.11	4.89	2.59		2.30	0.78	19.5	2.78	46.3
AUG	5.77	4.62	2.49		2.13	0.00	0.0	0.65	10.8
SEP	5.22	3.92	3.81		0.11	0.00	0.0	0.54	9.0
OCT	4.26	3.20	3.82	0.62		0.62	15.5	1.16	19.3
NOV	3.05	2.29	4.08	1.79		2.41	60.3	2.95	49.3
DEC	2.14	1.50	4.10	2.60		4.00	100.0	5.55	92.5

EAST TEXAS (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.92	1.34	3.45	2.11		4.00	100.0	6.00	100.0
FEB	2.35	1.65	3.56	1.91		4.00	100.0	6.00	100.0
MAR	3.19	2.39	3.57	1.18		4.00	100.0	6.00	100.0
APR	4.11	3.08	4.42	1.34		4.00	100.0	6.00	100.0
MAY	4.82	3.62	5.18	1.56		4.00	100.0	6.00	100.0
JUN	5.49	4.39	2.87		1.52	2.48	62.0	4.48	74.7
JUL	5.91	4.73	2.12		2.61	0.00	0.0	1.98	31.2
AUG	5.88	4.70	2.18		2.52	0.00	0.0	0.00	0.0
SEP	5.33	4.00	3.81		0.19	0.00	0.0	0.00	0.0
OCT	4.37	3.28	3.82	0.54		0.54	13.5	0.54	9.0
NOV	3.16	2.37	4.08	1.71		2.25	56.3	2.25	38.0
DEC	2.25	1.58	4.10	2.52		4.00	100.0	4.77	79.5

EAST TEXAS (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.03	1.42	3.45	2.03		4.00	100.0	6.00	100.0
FEB	2.46	1.72	3.56	1.84		4.00	100.0	6.00	100.0
MAR	3.30	2.48	3.57	1.09		4.00	100.0	6.00	100.0
APR	4.22	3.17	4.42	1.25		4.00	100.0	6.00	100.0
MAY	4.93	3.70	5.18	1.48		4.00	100.0	6.00	100.0
JUN	5.60	4.48	2.34		2.14	1.86	46.5	3.86	64.3
JUL	6.33	5.06	1.66		3.40	0.00	0.0	0.46	7.7
AUG	5.99	4.79	1.87		2.92	0.00	0.0	0.00	0.0
SEP	5.44	4.08	3.81		0.27	0.00	0.0	0.00	0.0
OCT	4.48	3.36	3.82	0.46		0.46	11.5	0.46	7.7
NOV	3.27	2.45	4.08	1.63		2.09	52.3	2.09	34.8
DEC	2.36	1.65	4.10	2.45		4.00	100.0	4.54	75.7

EAST TEXAS (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.14	1.50	3.45	1.95		4.00	100.0	6.00	100.0
FEB	2.57	1.80	3.56	1.76		4.00	100.0	6.00	100.0
MAR	3.41	2.56	3.57	1.01		4.00	100.0	6.00	100.0
APR	4.33	3.25	4.42	1.17		4.00	100.0	6.00	100.0
MAY	5.04	3.78	5.18	1.40		4.00	100.0	6.00	100.0
JUN	5.71	4.57	1.80		2.77	1.23	30.8	3.23	53.8
JUL	6.13	4.90	1.19		3.71	0.00	0.0	0.00	0.0
AUG	6.10	4.88	1.56		3.32	0.00	0.0	0.00	0.0
SEP	5.55	4.16	3.81		0.35	0.00	0.0	0.00	0.0
OCT	4.59	3.44	3.82	0.38		0.38	9.5	0.38	6.3
NOV	3.38	2.54	4.08	1.54		1.92	48.0	1.92	32.0
DEC	2.47	1.73	4.10	2.37		4.00	100.0	4.29	71.5

EAST TEXAS (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.92	1.34	3.45	2.11		4.00	100.0	6.00	100.0
FEB	2.35	1.65	3.56	1.91		4.00	100.0	6.00	100.0
MAR	2.97	2.23	3.57	1.34		4.00	100.0	6.00	100.0
APR	4.00	3.00	4.42	1.42		4.00	100.0	6.00	100.0
MAY	4.71	3.53	5.18	1.65		4.00	100.0	6.00	100.0
JUN	5.27	4.22	3.89		0.33	3.67	91.8	5.67	94.5
JUL	6.00	4.80	3.06		1.74	1.93	48.3	3.93	65.5
AUG	5.66	4.53	2.75		1.78	0.15	3.8	2.15	35.8
SEP	5.22	3.92	3.81		0.11	0.04	1.0	2.04	34.0
OCT	4.26	3.20	3.82	0.62		0.66	16.5	2.66	44.3
NOV	3.05	2.29	4.08	1.79		2.45	61.3	4.45	74.2
DEC	2.25	1.58	4.10	2.52		4.00	100.0	6.00	100.0

EAST TEXAS (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.03	1.42	3.45	2.03		4.00	100.0	6.00	100.0
FEB	2.46	1.72	3.56	1.84		4.00	100.0	6.00	100.0
MAR	3.19	2.39	3.57	1.18		4.00	100.0	6.00	100.0
APR	4.11	3.08	4.42	1.34		4.00	100.0	6.00	100.0
MAY	4.82	3.62	5.18	1.56		4.00	100.0	6.00	100.0
JUN	5.38	4.30	3.38		0.92	3.08	77.0	5.08	84.7
JUL	5.80	4.64	2.59		2.30	0.78	19.5	2.78	46.3
AUG	5.77	4.62	2.49		2.13	0.00	0.0	0.65	10.8
SEP	5.33	4.00	3.81		0.19	0.00	0.0	0.46	7.7
OCT	4.37	3.28	3.82	0.54		0.54	13.5	1.00	16.7
NOV	3.16	2.37	4.08	1.71		2.25	56.3	2.71	45.2
DEC	2.36	1.65	4.10	2.45		4.00	100.0	5.16	86.0

EAST TEXAS (+ 3 °F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.14	1.50	3.45	1.95		4.00	100.0	6.00	100.0
FEB	2.57	1.80	3.56	1.76		4.00	100.0	6.00	100.0
MAR	3.30	2.48	3.57	1.09		4.00	100.0	6.00	100.0
APR	4.22	3.17	4.42	1.25		4.00	100.0	6.00	100.0
MAY	4.93	3.70	5.18	1.48		4.00	100.0	6.00	100.0
JUN	5.49	4.39	2.87		1.52	2.48	62.0	4.48	74.7
JUL	5.91	4.73	2.12		2.61	0.00	0.0	1.87	31.2
AUG	5.88	4.70	2.18		2.52	0.00	0.0	0.00	0.0
SEP	5.44	4.08	3.81		0.27	0.00	0.0	0.00	0.0
OCT	4.48	3.36	3.82	0.46		0.46	11.5	0.46	7.7
NOV	3.27	2.45	4.08	1.63		2.09	52.3	2.09	34.8
DEC	2.47	1.73	4.10	2.37		4.00	100.0	4.46	74.3

EAST TEXAS (+ 4 °F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.25	1.58	3.45	1.87		4.00	100.0	6.00	100.0
FEB	2.68	1.88	3.56	1.68		4.00	100.0	6.00	100.0
MAR	3.41	2.56	3.57	1.01		4.00	100.0	6.00	100.0
APR	4.33	3.25	4.42	1.17		4.00	100.0	6.00	100.0
MAY	5.04	3.78	5.18	1.40		4.00	100.0	6.00	100.0
JUN	5.60	4.48	2.34		2.14	1.86	46.5	3.86	64.3
JUL	6.33	5.06	1.66		3.40	0.00	0.0	0.46	7.7
AUG	5.99	4.79	1.87		2.92	0.00	0.0	0.00	0.0
SEP	5.55	4.16	3.81		0.35	0.00	0.0	0.00	0.0
OCT	4.59	3.44	3.82	0.38		0.38	9.5	0.38	6.3
NOV	3.38	2.54	4.08	1.54		1.92	48.0	1.92	32.0
DEC	2.58	1.81	4.10	2.29		4.00	100.0	4.21	70.2

TRANS PECOS (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	3.60	2.52	0.54		1.98	0.00	0.0	0.00	0.0
FEB	4.50	3.15	0.39		2.76	0.00	0.0	0.00	0.0
MAR	6.10	4.58	0.40		4.18	0.00	0.0	0.00	0.0
APR	7.82	5.87	0.53		5.34	0.00	0.0	0.00	0.0
MAY	9.26	6.95	1.14		5.81	0.00	0.0	0.00	0.0
JUN	10.60	8.48	1.48		7.00	0.00	0.0	0.00	0.0
JUL	10.66	8.53	1.78		6.75	0.00	0.0	0.00	0.0
AUG	10.38	8.30	1.85		6.45	0.00	0.0	0.00	0.0
SEP	9.28	6.96	2.05		4.91	0.00	0.0	0.00	0.0
OCT	7.72	5.79	1.32		4.47	0.00	0.0	0.00	0.0
NOV	5.42	3.83	0.47		3.36	0.00	0.0	0.00	0.0
DEC	3.98	2.79	0.52		2.27	0.00	0.0	0.00	0.0

TRANS PECOS (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	3.80	2.66	0.46		2.20	0.00	0.0	0.00	0.0
FEB	4.70	3.29	0.39		2.90	0.00	0.0	0.00	0.0
MAR	6.30	4.73	0.28		4.45	0.00	0.0	0.00	0.0
APR	8.02	6.02	0.53		5.49	0.00	0.0	0.00	0.0
MAY	9.46	7.10	1.14		5.96	0.00	0.0	0.00	0.0
JUN	10.80	8.64	1.31		7.33	0.00	0.0	0.00	0.0
JUL	10.86	8.69	1.44		7.25	0.00	0.0	0.00	0.0
AUG	10.58	8.46	1.64		6.82	0.00	0.0	0.00	0.0
SEP	9.48	7.11	1.69		5.42	0.00	0.0	0.00	0.0
OCT	7.92	5.94	1.32		4.62	0.00	0.0	0.00	0.0
NOV	5.62	4.22	0.47		3.75	0.00	0.0	0.00	0.0
DEC	4.18	2.93	0.52		2.41	0.00	0.0	0.00	0.0

TRANS PECOS (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.00	2.80	0.38		2.42	0.00	0.0	0.00	0.0
FEB	4.50	3.15	0.39		2.76	0.00	0.0	0.00	0.0
MAR	6.50	4.88	0.25		4.63	0.00	0.0	0.00	0.0
APR	8.22	6.17	0.53		5.64	0.00	0.0	0.00	0.0
MAY	9.66	7.25	1.14		6.11	0.00	0.0	0.00	0.0
JUN	11.00	8.80	1.11		7.69	0.00	0.0	0.00	0.0
JUL	11.06	8.85	1.09		7.76	0.00	0.0	0.00	0.0
AUG	10.78	8.62	1.39		7.23	0.00	0.0	0.00	0.0
SEP	9.68	7.26	1.35		5.91	0.00	0.0	0.00	0.0
OCT	8.12	6.09	1.32		4.77	0.00	0.0	0.00	0.0
NOV	5.82	4.37	0.47		3.90	0.00	0.0	0.00	0.0
DEC	4.38	3.07	0.52		2.55	0.00	0.0	0.00	0.0

TRANS PECOS (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.20	2.94	0.31		2.63	0.00	0.0	0.00	0.0
FEB	5.10	3.57	0.39		3.18	0.00	0.0	0.00	0.0
MAR	6.70	5.03	0.21		4.82	0.00	0.0	0.00	0.0
APR	8.42	6.32	0.53		5.79	0.00	0.0	0.00	0.0
MAY	9.86	7.40	1.14		6.26	0.00	0.0	0.00	0.0
JUN	11.20	8.96	0.90		8.06	0.00	0.0	0.00	0.0
JUL	11.26	9.01	0.74		8.27	0.00	0.0	0.00	0.0
AUG	10.98	8.78	1.14		7.64	0.00	0.0	0.00	0.0
SEP	9.88	7.41	1.00		6.41	0.00	0.0	0.00	0.0
OCT	8.32	6.24	1.32		4.92	0.00	0.0	0.00	0.0
NOV	6.02	4.52	0.47		4.05	0.00	0.0	0.00	0.0
DEC	4.58	3.21	0.52		2.69	0.00	0.0	0.00	0.0

TRANS PECOS (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.40	3.08	0.23		2.85	0.00	0.0	0.00	0.0
FEB	5.30	3.71	0.39		3.32	0.00	0.0	0.00	0.0
MAR	6.90	5.18	0.17		4.99	0.00	0.0	0.00	0.0
APR	8.62	6.47	0.53		5.94	0.00	0.0	0.00	0.0
MAY	10.06	7.55	1.14		6.41	0.00	0.0	0.00	0.0
JUN	11.40	9.12	0.69		8.43	0.00	0.0	0.00	0.0
JUL	11.46	9.17	0.39		8.78	0.00	0.0	0.00	0.0
AUG	11.18	8.94	0.88		8.06	0.00	0.0	0.00	0.0
SEP	10.08	7.56	0.66		6.90	0.00	0.0	0.00	0.0
OCT	8.52	6.39	1.32		5.07	0.00	0.0	0.00	0.0
NOV	6.22	4.67	0.47		4.20	0.00	0.0	0.00	0.0
DEC	4.78	3.35	0.52		2.83	0.00	0.0	0.00	0.0

TRANS PECOS (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.00	2.80	0.38		2.42	0.00	0.0	0.00	0.0
FEB	4.50	3.15	0.39		2.76	0.00	0.0	0.00	0.0
MAR	6.30	4.73	0.28		4.45	0.00	0.0	0.00	0.0
APR	8.02	6.02	0.53		5.49	0.00	0.0	0.00	0.0
MAY	9.46	7.10	1.14		5.96	0.00	0.0	0.00	0.0
JUN	10.60	8.48	1.48		7.00	0.00	0.0	0.00	0.0
JUL	10.66	8.53	1.78		6.75	0.00	0.0	0.00	0.0
AUG	10.38	8.30	1.85		6.45	0.00	0.0	0.00	0.0
SEP	9.48	7.11	1.69		5.42	0.00	0.0	0.00	0.0
OCT	7.92	5.94	1.32		4.62	0.00	0.0	0.00	0.0
NOV	5.62	4.22	0.47		3.75	0.00	0.0	0.00	0.0
DEC	4.38	3.07	0.52		2.55	0.00	0.0	0.00	0.0

TRANS PECOS (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.20	2.94	0.31		2.63	0.00	0.0	0.00	0.0
FEB	5.10	3.57	0.39		3.18	0.00	0.0	0.00	0.0
MAR	6.50	4.88	0.25		4.63	0.00	0.0	0.00	0.0
APR	8.22	6.17	0.53		5.64	0.00	0.0	0.00	0.0
MAY	9.66	7.25	1.14		6.11	0.00	0.0	0.00	0.0
JUN	10.80	8.64	1.31		7.33	0.00	0.0	0.00	0.0
JUL	10.86	8.69	1.44		7.25	0.00	0.0	0.00	0.0
AUG	10.58	8.46	1.64		6.82	0.00	0.0	0.00	0.0
SEP	9.68	7.26	1.35		5.91	0.00	0.0	0.00	0.0
OCT	8.12	6.09	1.32		4.77	0.00	0.0	0.00	0.0
NOV	5.82	4.37	0.47		3.90	0.00	0.0	0.00	0.0
DEC	4.58	3.21	0.52		2.69	0.00	0.0	0.00	0.0

TRANS PECOS (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.40	3.08	0.23		2.85	0.00	0.0	0.00	0.0
FEB	5.30	3.71	0.39		3.32	0.00	0.0	0.00	0.0
MAR	6.70	5.03	0.21		4.82	0.00	0.0	0.00	0.0
APR	8.42	6.32	0.53		5.79	0.00	0.0	0.00	0.0
MAY	9.86	7.40	1.14		6.26	0.00	0.0	0.00	0.0
JUN	11.00	8.80	1.11		7.69	0.00	0.0	0.00	0.0
JUL	11.06	8.85	1.09		7.76	0.00	0.0	0.00	0.0
AUG	10.78	8.62	1.39		7.23	0.00	0.0	0.00	0.0
SEP	9.88	7.41	1.00		6.41	0.00	0.0	0.00	0.0
OCT	8.32	6.24	1.32		4.92	0.00	0.0	0.00	0.0
NOV	6.02	4.52	0.47		4.05	0.00	0.0	0.00	0.0
DEC	4.78	3.35	0.52		2.83	0.00	0.0	0.00	0.0

TRANS PECOS (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	4.60	3.22	0.16		3.06	0.00	0.0	0.00	0.0
FEB	5.50	3.85	0.39		3.45	0.00	0.0	0.00	0.0
MAR	6.90	5.18	0.17		4.99	0.00	0.0	0.00	0.0
APR	8.62	6.47	0.53		5.94	0.00	0.0	0.00	0.0
MAY	10.06	7.55	1.14		6.41	0.00	0.0	0.00	0.0
JUN	11.20	8.96	0.90		8.06	0.00	0.0	0.00	0.0
JUL	11.26	9.01	0.74		8.27	0.00	0.0	0.00	0.0
AUG	10.98	8.78	1.14		7.64	0.00	0.0	0.00	0.0
SEP	10.08	7.56	0.66		6.90	0.00	0.0	0.00	0.0
OCT	8.52	6.39	1.32		5.07	0.00	0.0	0.00	0.0
NOV	6.22	4.67	0.47		4.20	0.00	0.0	0.00	0.0
DEC	4.98	3.49	0.52		2.97	0.00	0.0	0.00	0.0

EDWARDS PLATEAU (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.74	0.52	1.11	0.59		0.91	22.8	0.91	15.2
FEB	1.49	1.04	1.41	0.37		1.28	32.0	1.28	21.3
MAR	2.94	2.21	1.29		0.92	0.36	9.0	0.36	6.0
APR	4.47	3.35	2.23		1.12	0.00	0.0	0.00	0.0
MAY	5.46	4.10	3.21		0.89	0.00	0.0	0.00	0.0
JUN	6.58	5.26	2.65		2.61	0.00	0.0	0.00	0.0
JUL	7.07	5.66	1.72		3.94	0.00	0.0	0.00	0.0
AUG	7.07	5.66	2.31		3.35	0.00	0.0	0.00	0.0
SEP	6.01	4.51	3.15		1.36	0.00	0.0	0.00	0.0
OCT	4.43	3.32	2.72		0.60	0.00	0.0	0.00	0.0
NOV	2.59	1.94	1.28		0.66	0.00	0.0	0.00	0.0
DEC	1.14	0.86	1.18	0.32		0.32	8.0	0.32	5.3

EDWARDS PLATEAU (+ 1°F UNIFORM)

MONTH	ME _c	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.91	0.64	1.11	0.47		0.73	18.3	0.73	12.2
FEB	1.67	1.17	1.41	0.24		0.97	24.3	0.97	16.2
MAR	3.11	2.33	1.21		1.12	0.00	0.0	0.00	0.0
APR	4.64	3.48	2.09		1.39	0.00	0.0	0.00	0.0
MAY	5.63	4.22	2.86		1.36	0.00	0.0	0.00	0.0
JUN	6.75	5.40	2.19		3.21	0.00	0.0	0.00	0.0
JUL	7.24	5.79	1.14		4.65	0.00	0.0	0.00	0.0
AUG	7.24	5.79	1.80		3.99	0.00	0.0	0.00	0.0
SEP	6.18	4.64	2.88		1.76	0.00	0.0	0.00	0.0
OCT	4.60	3.45	2.72		0.73	0.00	0.0	0.00	0.0
NOV	2.76	2.07	1.28		0.79	0.00	0.0	0.00	0.0
DEC	1.31	0.92	1.18	0.26		0.26	6.5	0.26	4.3

EDWARDS PLATEAU (+ 2°F UNIFORM)

MONTH	ME _o	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.09	0.76	1.11	0.35		0.49	12.3	0.49	8.2
FEB	1.84	1.29	1.41	0.12		0.61	15.3	0.61	10.2
MAR	3.29	2.47	1.12		1.35	0.00	0.0	0.00	0.0
APR	4.82	3.62	1.94		1.68	0.00	0.0	0.00	0.0
MAY	5.81	4.36	2.49		1.87	0.00	0.0	0.00	0.0
JUN	6.93	5.54	1.80		3.74	0.00	0.0	0.00	0.0
JUL	7.42	5.94	0.55		5.39	0.00	0.0	0.00	0.0
AUG	7.42	5.94	1.31		4.63	0.00	0.0	0.00	0.0
SEP	6.36	4.77	2.60		2.17	0.00	0.0	0.00	0.0
OCT	4.78	3.59	2.72		0.87	0.00	0.0	0.00	0.0
NOV	2.94	2.21	1.28		0.93	0.00	0.0	0.00	0.0
DEC	1.49	1.04	1.18	0.14		0.14	3.5	0.14	2.3

EDWARDS PLATEAU (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.26	0.88	1.11	0.23		0.24	6.0	0.24	4.0
FEB	2.02	1.41	1.41	0.00	0.00	0.24	6.0	0.24	4.0
MAR	3.46	2.60	1.03		1.57	0.00	0.0	0.00	0.0
APR	4.99	3.74	1.78		1.96	0.00	0.0	0.00	0.0
MAY	5.98	4.49	2.13		2.36	0.00	0.0	0.00	0.0
JUN	7.10	5.68	1.38		4.30	0.00	0.0	0.00	0.0
JUL	7.59	6.07	0.00		6.07	0.00	0.0	0.00	0.0
AUG	7.59	6.07	0.81		5.26	0.00	0.0	0.00	0.0
SEP	6.53	4.90	2.31		2.59	0.00	0.0	0.00	0.0
OCT	4.95	3.71	2.72		0.99	0.00	0.0	0.00	0.0
NOV	3.11	2.33	1.28		1.05	0.00	0.0	0.00	0.0
DEC	1.67	1.17	1.18	0.01		0.01	0.3	0.01	0.2

EDWARDS PLATEAU (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.44	1.01	1.11	0.10		0.10	2.5	0.10	1.7
FEB	2.19	1.53	1.41		0.12	0.00	0.0	0.00	0.0
MAR	3.64	2.73	0.95		1.78	0.00	0.0	0.00	0.0
APR	5.17	3.88	1.63		2.25	0.00	0.0	0.00	0.0
MAY	6.16	4.62	1.76		2.86	0.00	0.0	0.00	0.0
JUN	7.28	5.82	0.95		4.87	0.00	0.0	0.00	0.0
JUL	7.77	6.22	0.00		6.22	0.00	0.0	0.00	0.0
AUG	7.77	6.22	0.32		5.90	0.00	0.0	0.00	0.0
SEP	6.71	5.03	2.03		3.00	0.00	0.0	0.00	0.0
OCT	5.13	3.85	2.72		1.13	0.00	0.0	0.00	0.0
NOV	3.27	2.45	1.28		1.17	0.00	0.0	0.00	0.0
DEC	1.84	1.29	1.18		0.11	0.00	0.0	0.00	0.0

EDWARDS PLATEAU (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.09	0.76	1.11	0.35		0.49	12.3	0.49	8.2
FEB	1.84	1.29	1.41	0.12		0.61	15.3	0.61	10.2
MAR	3.11	2.33	1.21		1.12	0.00	0.0	0.00	0.0
APR	4.64	3.48	2.09		1.39	0.00	0.0	0.00	0.0
MAY	5.63	4.22	2.86		1.36	0.00	0.0	0.00	0.0
JUN	6.58	5.26	2.65		2.61	0.00	0.0	0.00	0.0
JUL	7.07	5.66	1.72		3.94	0.00	0.0	0.00	0.0
AUG	7.07	5.66	2.31		3.35	0.00	0.0	0.00	0.0
SEP	6.18	4.64	2.88		1.76	0.00	0.0	0.00	0.0
OCT	4.60	3.45	2.72		0.73	0.00	0.0	0.00	0.0
NOV	2.76	2.07	1.28		0.79	0.00	0.0	0.00	0.0
DEC	1.49	1.04	1.18	0.14		0.14	3.5	0.14	2.3

EDWARDS PLATEAU (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.26	0.88	1.11	0.23		0.24	6.0	0.24	4.0
FEB	2.02	1.41	1.41	0.00	0.00	0.24	6.0	0.24	4.0
MAR	3.29	2.47	1.12		1.35	0.00	0.0	0.00	0.0
APR	4.82	3.62	1.94		1.68	0.00	0.0	0.00	0.0
MAY	5.81	4.36	2.49		1.87	0.00	0.0	0.00	0.0
JUN	6.75	5.40	2.19		3.21	0.00	0.0	0.00	0.0
JUL	7.24	5.79	1.14		4.65	0.00	0.0	0.00	0.0
AUG	7.24	5.79	1.80		3.99	0.00	0.0	0.00	0.0
SEP	6.36	4.77	2.60		2.17	0.00	0.0	0.00	0.0
OCT	4.78	3.59	2.72		0.87	0.00	0.0	0.00	0.0
NOV	2.94	2.21	1.28		0.93	0.00	0.0	0.00	0.0
DEC	1.67	1.17	1.18	0.01		0.01	0.3	0.01	0.2

EDWARDS PLATEAU (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.44	1.01	1.11	0.10		0.10	2.5	0.10	1.7
FEB	2.19	1.53	1.41		0.12	0.00	0.0	0.00	0.0
MAR	3.46	2.60	1.03		1.57	0.00	0.0	0.00	0.0
APR	4.99	3.74	1.78		1.96	0.00	0.0	0.00	0.0
MAY	5.98	4.49	2.13		2.36	0.00	0.0	0.00	0.0
JUN	6.93	5.54	1.80		3.74	0.00	0.0	0.00	0.0
JUL	7.42	5.94	0.55		5.39	0.00	0.0	0.00	0.0
AUG	7.42	5.94	1.31		4.63	0.00	0.0	0.00	0.0
SEP	6.53	4.90	2.31		2.59	0.00	0.0	0.00	0.0
OCT	4.95	3.71	2.72		0.99	0.00	0.0	0.00	0.0
NOV	3.11	2.33	1.28		1.05	0.00	0.0	0.00	0.0
DEC	1.84	1.29	1.18		0.11	0.00	0.0	0.00	0.0

EDWARDS PLATEAU (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.61	1.13	1.11		0.02	0.00	0.0	0.00	0.0
FEB	2.37	1.66	1.41		0.25	0.00	0.0	0.00	0.0
MAR	3.64	2.73	0.95		1.78	0.00	0.0	0.00	0.0
APR	5.17	3.88	1.63		2.25	0.00	0.0	0.00	0.0
MAY	6.16	4.62	1.76		2.86	0.00	0.0	0.00	0.0
JUN	7.10	5.68	1.38		4.30	0.00	0.0	0.00	0.0
JUL	7.59	6.07	0.00		6.07	0.00	0.0	0.00	0.0
AUG	7.59	6.07	0.81		5.26	0.00	0.0	0.00	0.0
SEP	6.71	5.03	2.03		3.00	0.00	0.0	0.00	0.0
OCT	5.13	3.85	2.72		1.13	0.00	0.0	0.00	0.0
NOV	3.27	2.45	1.28		1.17	0.00	0.0	0.00	0.0
DEC	2.02	1.41	1.18		0.23	0.00	0.0	0.00	0.0

SOUTH CENTRAL (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	% SM 4	SM 6	% SM 6
JAN	1.08	.076	2.08	1.32		3.32	83.0	3.32	55.3
FEB	1.68	1.18	2.35	1.17		4.00	100.0	4.49	74.8
MAR	2.78	2.09	1.81		0.28	3.72	93.0	4.21	70.2
APR	3.90	2.93	2.87		0.06	3.66	91.5	4.15	69.2
MAY	4.75	3.56	4.07	0.51		4.00	100.0	4.66	77.7
JUN	5.53	4.42	3.60		0.82	3.18	79.5	3.84	64.0
JUL	6.09	4.87	2.25		2.62	0.56	14.0	1.22	20.3
AUG	6.10	4.88	2.84		2.04	0.00	0.0	0.00	0.0
SEP	5.40	4.05	4.38	0.33		0.33	8.3	0.33	5.5
OCT	4.21	3.16	3.45	0.29		0.62	15.5	0.62	10.3
NOV	2.68	2.01	2.41	0.40		1.02	25.5	1.02	17.0
DEC	1.54	1.08	2.06	0.98		2.00	50.0	2.00	33.3

SOUTH CENTRAL (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.24	0.87	1.95	1.08		2.40	60.0	2.40	40.0
FEB	1.84	1.29	2.21	0.92		3.32	83.0	3.32	55.3
MAR	2.94	2.21	1.81		0.40	2.92	73.0	2.92	48.7
APR	4.06	3.05	2.59		0.46	2.46	61.5	2.46	41.0
MAY	4.91	3.68	3.30		0.38	2.08	52.0	2.08	34.7
JUN	5.69	4.55	3.11		1.44	0.64	16.0	0.64	10.7
JUL	6.25	5.00	1.37		3.63	0.00	0.0	0.00	0.0
AUG	6.26	5.01	2.43		2.58	0.00	0.0	0.00	0.0
SEP	5.56	4.17	3.90		0.27	0.00	0.0	0.00	0.0
OCT	4.37	3.28	3.45	0.17		0.17	4.3	0.17	2.8
NOV	2.84	2.13	2.41	0.28		0.45	11.3	0.45	7.5
DEC	1.70	1.19	2.06	0.87		1.32	33.0	1.32	22.0

SOUTH CENTRAL (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.39	0.97	1.84	0.87		1.86	46.5	1.86	31.0
FEB	1.99	1.39	2.11	0.72		2.58	64.5	2.58	43.0
MAR	3.09	2.32	1.81		0.51	2.07	51.8	2.07	34.5
APR	4.21	3.16	2.34		0.82	1.25	31.3	1.25	20.8
MAY	5.06	3.80	2.81		0.99	0.26	6.5	0.26	4.3
JUN	5.84	4.67	2.29		2.38	0.00	0.0	0.00	0.0
JUL	6.40	5.12	0.47		4.65	0.00	0.0	0.00	0.0
AUG	6.41	5.13	1.84		3.29	0.00	0.0	0.00	0.0
SEP	5.71	4.28	3.43		0.85	0.00	0.0	0.00	0.0
OCT	4.52	3.39	3.45	0.06		0.06	1.5	0.06	1.0
NOV	2.99	2.24	2.41	0.17		0.23	5.8	0.23	3.8
DEC	1.85	1.30	2.06	0.76		0.99	24.8	0.99	16.5

SOUTH CENTRAL (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.54	1.08	1.72	0.64		1.34	33.5	1.34	22.3
FEB	2.15	1.51	2.00	0.49		1.83	45.8	1.83	30.5
MAR	3.25	2.44	1.81		0.63	1.20	30.0	1.20	20.0
APR	4.37	3.28	2.08		1.20	0.00	0.0	0.00	0.0
MAY	5.22	3.92	2.30		1.62	0.00	0.0	0.00	0.0
JUN	6.00	4.80	1.47		3.33	0.00	0.0	0.00	0.0
JUL	6.56	5.25	0.00		5.25	0.00	0.0	0.00	0.0
AUG	6.57	5.26	1.25		4.01	0.00	0.0	0.00	0.0
SEP	5.87	4.40	2.96		1.44	0.00	0.0	0.00	0.0
OCT	4.68	3.51	3.45		0.06	0.00	0.0	0.00	0.0
NOV	3.15	2.36	2.41	0.05		0.05	1.3	0.05	0.8
DEC	2.01	1.41	2.06	0.65		0.70	17.5	0.70	11.7

SOUTH CENTRAL (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.70	1.19	1.60	0.41		0.96	24.0	0.96	16.0
FEB	2.30	1.61	1.90	0.29		1.25	31.3	1.25	20.8
MAR	3.40	2.55	1.81		0.74	0.51	12.8	0.51	8.5
APR	4.52	3.39	1.81		1.58	0.00	0.0	0.00	0.0
MAY	5.37	4.03	1.80		2.23	0.00	0.0	0.00	0.0
JUN	6.15	4.92	0.65		4.27	0.00	0.0	0.00	0.0
JUL	6.71	5.37	0.00		5.37	0.00	0.0	0.00	0.0
AUG	6.72	5.38	0.66		4.72	0.00	0.0	0.00	0.0
SEP	6.02	4.52	2.49		2.03	0.00	0.0	0.00	0.0
OCT	4.83	3.62	3.45		0.17	0.00	0.0	0.00	0.0
NOV	3.30	2.48	2.41		0.07	0.00	0.0	0.00	0.0
DEC	2.16	1.51	2.06	0.55		0.55	13.8	0.55	9.2

SOUTH CENTRAL (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.39	0.97	1.84	0.87		2.08	52.0	2.08	34.7
FEB	1.99	1.39	2.11	0.72		2.80	70.0	2.80	46.7
MAR	2.94	2.21	1.81		0.40	2.40	60.0	2.40	40.0
APR	4.06	3.05	2.59		0.46	1.96	48.5	1.96	32.3
MAY	4.91	3.68	3.30		0.38	1.56	39.0	1.56	26.0
JUN	5.53	4.42	3.60		0.82	0.74	18.5	0.74	12.3
JUL	6.09	4.87	2.25		2.62	0.00	0.0	0.00	0.0
AUG	6.10	4.88	2.84		2.04	0.00	0.0	0.00	0.0
SEP	5.56	4.17	3.90		0.27	0.00	0.0	0.00	0.0
OCT	4.37	3.28	3.45	0.17		0.17	4.3	0.17	2.8
NOV	2.84	2.13	2.41	0.28		0.45	11.3	0.45	7.5
DEC	1.85	1.30	2.06	0.76		1.21	30.3	1.21	20.2

SOUTH CENTRAL (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.54	1.08	1.72	0.64		1.52	38.0	1.52	25.3
FEB	2.15	1.51	2.00	0.49		2.01	50.3	2.01	33.5
MAR	3.09	2.32	1.81		0.51	1.50	37.5	1.50	25.0
APR	4.21	3.16	2.34		0.82	0.68	17.0	0.68	11.3
MAY	5.06	3.80	2.81		0.99	0.00	0.0	0.00	0.0
JUN	5.69	4.55	3.11		1.44	0.00	0.0	0.00	0.0
JUL	6.25	5.00	1.37		3.63	0.00	0.0	0.00	0.0
AUG	6.26	5.01	2.43		2.58	0.00	0.0	0.00	0.0
SEP	5.71	4.28	3.43		0.85	0.00	0.0	0.00	0.0
OCT	4.52	3.39	3.45	0.06		0.06	1.5	0.06	1.0
NOV	2.99	2.24	2.41	0.17		0.23	5.8	0.23	3.8
DEC	2.01	1.41	2.06	0.65		0.88	22.0	0.88	14.7

SOUTH CENTRAL (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.70	1.19	1.60	0.41		1.01	25.3	1.01	16.8
FEB	2.30	1.61	1.90	0.29		1.30	32.5	1.30	21.7
MAR	3.25	2.44	1.81		0.63	0.67	16.8	0.67	11.2
APR	4.37	3.28	2.08		1.20	0.00	0.0	0.00	0.0
MAY	5.22	3.92	2.30		1.62	0.00	0.0	0.00	0.0
JUN	5.84	4.67	2.29		2.38	0.00	0.0	0.00	0.0
JUL	6.40	5.12	0.47		4.65	0.00	0.0	0.00	0.0
AUG	6.41	5.13	1.84		3.29	0.00	0.0	0.00	0.0
SEP	5.87	4.40	2.96		1.44	0.00	0.0	0.00	0.0
OCT	4.68	3.51	3.45		0.06	0.00	0.0	0.00	0.0
NOV	3.15	2.36	2.41	0.05		0.05	1.3	0.05	0.8
DEC	2.16	1.51	2.06	0.55		0.60	15.0	0.60	10.0

SOUTH CENTRAL (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.85	1.30	1.48	0.18		0.62	15.5	0.62	10.3
FEB	2.46	1.72	1.88	0.16		0.78	19.5	0.78	13.0
MAR	3.40	2.55	1.81		0.74	0.04	1.0	0.04	0.7
APR	4.52	3.39	1.81		1.58	0.00	0.0	0.00	0.0
MAY	5.37	4.03	1.80		2.23	0.00	0.0	0.00	0.0
JUN	6.00	4.80	1.47		3.33	0.00	0.0	0.00	0.0
JUL	6.56	5.25	0.00		5.25	0.00	0.0	0.00	0.0
AUG	6.57	5.26	1.25		4.01	0.00	0.0	0.00	0.0
SEP	6.02	4.52	2.49		2.03	0.00	0.0	0.00	0.0
OCT	4.83	3.62	3.45		0.17	0.00	0.0	0.00	0.0
NOV	3.30	2.48	2.41		0.07	0.00	0.0	0.00	0.0
DEC	2.32	1.62	2.06	0.44		0.44	11.0	0.44	7.3

UPPER COAST (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.18	1.53	3.36	1.83		4.00	100.0	6.00	100.0
FEB	2.54	1.78	3.22	1.44		4.00	100.0	6.00	100.0
MAR	3.26	2.45	2.62	0.17		4.00	100.0	6.00	100.0
APR	4.07	3.05	3.18	0.13		4.00	100.0	6.00	100.0
MAY	4.73	3.55	4.60	1.05		4.00	100.0	6.00	100.0
JUN	5.36	4.29	4.65	0.36		4.00	100.0	6.00	100.0
JUL	5.61	4.49	4.28		0.21	3.79	94.8	5.79	96.5
AUG	5.59	4.47	4.40		0.07	3.72	93.0	5.72	95.3
SEP	5.22	3.92	5.66	1.74		4.00	100.0	6.00	100.0
OCT	4.41	3.31	4.17	0.86		4.00	100.0	6.00	100.0
NOV	3.29	2.47	3.75	1.28		4.00	100.0	6.00	100.0
DEC	2.52	1.76	3.63	1.87		4.00	100.0	6.00	100.0

UPPER COAST (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.29	1.60	3.20	1.60		4.00	100.0	6.00	100.0
FEB	2.66	1.86	3.22	1.36		4.00	100.0	6.00	100.0
MAR	3.38	2.54	2.62	0.08		4.00	100.0	6.00	100.0
APR	4.19	3.14	2.81		0.33	3.67	91.8	5.67	94.5
MAY	4.85	3.64	4.60	0.96		4.00	100.0	6.00	100.0
JUN	5.37	4.30	3.74		0.56	3.44	86.0	5.44	90.7
JUL	5.73	4.58	2.78		1.80	1.64	41.0	3.64	60.7
AUG	5.71	4.57	3.84		0.73	0.91	22.8	0.91	48.5
SEP	5.34	4.01	5.66	1.65		2.56	64.0	4.56	76.0
OCT	4.53	3.40	4.17	0.77		3.33	83.3	5.33	88.8
NOV	3.42	2.57	3.75	1.18		4.00	100.0	6.00	100.0
DEC	2.64	1.85	3.63	1.78		4.00	100.0	6.00	100.0

UPPER COAST (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.41	1.69	3.06	1.37		4.00	100.0	6.00	100.0
FEB	2.77	1.94	3.22	1.28		4.00	100.0	6.00	100.0
MAR	3.49	2.62	2.62	0.00	0.00	4.00	100.0	6.00	100.0
APR	4.30	3.22	2.61		0.61	4.00	100.0	6.00	100.0
MAY	4.96	3.72	4.60	0.88		4.00	100.0	6.00	100.0
JUN	5.59	4.47	2.85		1.62	2.38	59.5	4.38	73.0
JUL	5.85	4.68	1.23		3.45	0.00	0.0	0.93	15.5
AUG	5.82	4.66	2.94		1.72	0.00	0.0	0.00	0.0
SEP	5.45	4.09	5.66	1.57		1.57	39.3	1.57	26.2
OCT	4.64	3.48	4.17	0.69		2.26	56.5	2.26	37.7
NOV	3.52	2.64	3.75	1.11		3.37	84.2	3.37	56.1
DEC	2.75	1.93	3.63	1.70		4.00	100.0	5.07	82.1

UPPER COAST (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.52	1.76	2.91	1.15		4.00	100.0	5.60	93.3
FEB	2.89	2.02	3.22	1.20		4.00	100.0	6.00	100.0
MAR	3.60	2.70	2.62		0.08	3.92	98.0	5.92	98.7
APR	4.42	3.32	2.34		0.98	2.94	73.5	4.94	82.3
MAY	5.07	3.80	4.60	0.80		3.74	93.5	5.74	95.7
JUN	5.71	4.67	1.95		2.72	1.02	25.5	3.02	50.3
JUL	5.96	4.77	0.00		4.77	0.00	0.0	0.00	0.0
AUG	5.94	4.75	2.04		2.71	0.00	0.0	0.00	0.0
SEP	5.57	4.18	5.66	1.48		1.48	37.0	1.48	24.7
OCT	4.75	3.56	4.17	0.61		2.09	52.3	2.09	34.8
NOV	3.63	2.72	3.75	1.03		3.12	78.0	3.12	52.0
DEC	2.87	2.30	3.63	1.33		4.00	100.0	4.45	74.2

UPPER COAST (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.64	1.85	2.75	0.90		4.00	100.0	5.30	88.3
FEB	3.00	2.10	3.22	1.12		4.00	100.0	6.0	100.0
MAR	3.72	2.79	2.62		0.17	3.83	95.8	5.83	97.2
APR	4.53	3.40	2.04		1.36	2.47	61.8	4.47	74.5
MAY	5.19	3.89	4.60	0.71		3.18	79.5	5.18	86.3
JUN	5.82	4.66	1.05		3.61	0.00	0.0	1.57	26.2
JUL	6.07	4.86	0.00		4.86	0.00	0.0	0.00	0.0
AUG	6.05	4.84	1.14		3.70	0.00	0.0	0.00	0.0
SEP	5.68	4.26	5.66	1.40		1.40	35.0	1.40	23.3
OCT	4.87	3.65	4.17	0.52		1.92	48.0	1.92	32.0
NOV	3.75	2.81	3.75	0.94		2.86	71.5	2.86	47.7
DEC	2.98	2.09	3.63	1.54		4.00	100.0	4.40	73.3

UPPER COAST (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.41	1.69	3.06	1.37		4.00	100.0	6.00	100.0
FEB	2.77	1.94	3.22	1.28		4.00	100.0	6.00	100.0
MAR	3.38	2.54	2.62	0.08		4.00	100.0	6.00	100.0
APR	4.19	3.14	2.81		0.33	3.67	91.8	5.67	94.5
MAY	4.85	3.64	4.60	0.96		4.00	100.0	6.00	100.0
JUN	5.36	4.29	4.65	0.36		4.00	100.0	6.00	100.0
JUL	5.61	4.49	4.28		0.21	3.79	94.8	5.79	96.5
AUG	5.59	4.47	4.40		0.07	3.72	93.0	5.72	95.3
SEP	5.34	4.01	5.66	1.65		4.00	100.0	6.00	100.0
OCT	4.53	3.40	4.17	0.77		4.00	100.0	6.00	100.0
NOV	3.42	2.57	3.75	1.18		4.00	100.0	6.00	100.0
DEC	2.75	1.93	3.63	1.70		4.00	100.0	6.00	100.0

UPPER COAST (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.52	1.76	2.91	1.15		4.00	100.0	6.00	100.0
FEB	2.89	2.02	3.22	1.20		4.00	100.0	6.00	100.0
MAR	3.49	2.62	2.62	0.00	0.00	4.00	100.0	6.00	100.0
APR	4.30	3.22	2.61		0.61	3.39	84.8	5.39	89.8
MAY	4.96	3.72	4.60	0.88		4.00	100.0	6.00	100.0
JUN	5.48	4.30	3.74		0.56	3.44	86.0	5.44	90.7
JUL	5.73	4.58	2.78		1.80	1.64	41.0	3.64	60.7
AUG	5.71	4.57	3.84		0.73	0.91	22.8	2.91	48.5
SEP	5.45	4.09	5.66	1.57		2.48	62.0	4.48	74.7
OCT	4.64	3.48	4.17	0.69		3.17	79.3	5.17	86.2
NOV	3.52	2.82	3.75	0.93		4.00	100.0	6.00	100.0
DEC	2.87	2.30	3.63	1.33		4.00	100.0	6.00	100.0

UPPER COAST (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.64	1.85	2.75	0.90		4.00	100.0	5.56	92.7
FEB	3.00	2.10	3.22	1.12		4.00	100.0	6.00	100.0
MAR	3.60	2.70	2.62		0.08	3.92	98.0	5.92	98.7
APR	4.42	3.32	2.34		0.98	2.94	73.5	4.94	82.3
MAY	5.07	3.80	4.60	0.80		3.74	93.5	5.74	95.7
JUN	5.59	4.47	2.85		1.62	2.12	53.0	4.12	68.7
JUL	5.85	4.68	1.23		3.45	0.00	0.0	0.67	11.2
AUG	5.82	4.66	2.94		1.72	0.00	0.0	0.00	0.0
SEP	5.57	4.18	5.66	1.48		1.48	37.0	1.48	24.7
OCT	4.75	3.56	4.17	0.61		2.09	52.3	2.09	34.8
NOV	3.63	2.72	3.75	1.03		3.12	78.0	3.12	52.0
DEC	2.98	2.09	3.63	1.54		4.00	100.0	4.66	77.7

UPPER COAST (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.75	1.93	2.60	0.67		4.00	100.0	4.99	83.2
FEB	3.12	2.18	3.22	1.04		4.00	100.0	6.00	100.0
MAR	3.72	2.79	2.62		0.17	3.83	95.8	5.83	97.2
APR	4.53	3.40	2.04		1.36	2.47	61.8	4.47	74.5
MAY	5.19	3.89	4.60	0.71		3.18	79.5	5.18	86.3
JUN	5.71	4.67	1.95		2.72	0.46	11.5	2.46	41.0
JUL	5.96	4.77	0.00		4.70	0.00	0.0	0.00	0.0
AUG	5.94	4.75	2.04		2.71	0.00	0.0	0.00	0.0
SEP	5.68	4.26	5.66	1.40		1.40	35.0	1.40	23.3
OCT	4.87	3.65	4.17	0.52		1.92	48.0	1.92	32.0
NOV	3.75	2.81	3.75	0.94		2.86	71.5	2.86	47.7
DEC	3.10	2.17	3.63	1.46		4.00	100.0	4.32	72.0

SOUTHERN TEXAS (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.06	0.04	1.11	1.07		1.75	43.8	1.75	29.2
FEB	0.72	0.50	1.28	0.78		2.53	63.3	2.53	42.2
MAR	2.20	1.65	0.81		0.84	1.69	42.3	1.69	28.2
APR	3.88	2.91	1.88		1.03	0.66	16.5	0.66	11.0
MAY	4.88	3.66	3.17		0.49	0.17	4.3	0.17	2.8
JUN	5.76	4.61	2.75		1.86	0.00	0.0	0.00	0.0
JUL	6.20	4.96	1.48		3.48	0.00	0.0	0.00	0.0
AUG	6.26	5.01	2.34		2.67	0.00	0.0	0.00	0.0
SEP	5.28	3.96	3.49		0.47	0.00	0.0	0.00	0.0
OCT	3.76	2.82	2.57		0.25	0.00	0.0	0.00	0.0
NOV	1.86	1.40	1.17		0.23	0.00	0.0	0.00	0.0
DEC	0.44	0.31	0.99	0.68		0.68	17.0	0.68	11.3

SOUTHERN TEXAS (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.26	0.18	1.04	0.86		1.40	35.0	1.40	23.3
FEB	0.92	0.64	1.19	0.55		1.95	48.8	1.95	32.5
MAR	2.40	1.80	0.81		0.99	0.96	24.0	0.96	16.0
APR	4.08	3.06	1.72		1.34	0.00	0.0	0.00	0.0
MAY	5.08	3.81	2.84		0.97	0.00	0.0	0.00	0.0
JUN	5.96	4.77	2.22		2.55	0.00	0.0	0.00	0.0
JUL	6.40	5.12	0.92		4.20	0.00	0.0	0.00	0.0
AUG	6.46	5.17	1.82		3.35	0.00	0.0	0.00	0.0
SEP	5.48	4.11	2.99		1.12	0.00	0.0	0.00	0.0
OCT	3.96	2.97	2.57		0.40	0.00	0.0	0.00	0.0
NOV	2.06	1.55	1.02		0.53	0.00	0.0	0.00	0.0
DEC	0.64	0.45	0.99	0.54		0.54	13.5	0.54	9.0

SOUTHERN TEXAS (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.46	0.32	0.94	0.62		1.02	25.5	1.02	17.0
FEB	1.12	0.78	1.09	0.31		1.33	33.3	1.33	22.2
MAR	2.60	1.95	0.81		1.14	0.19	4.8	0.19	3.2
APR	4.28	3.21	1.54		1.67	0.00	0.0	0.00	0.0
MAY	5.28	3.96	2.48		1.48	0.00	0.0	0.00	0.0
JUN	6.16	4.93	1.68		3.25	0.00	0.0	0.00	0.0
JUL	6.60	5.28	0.37		4.91	0.00	0.0	0.00	0.0
AUG	6.66	5.33	1.25		4.08	0.00	0.0	0.00	0.0
SEP	5.68	4.26	2.44		1.82	0.00	0.0	0.00	0.0
OCT	4.26	3.20	2.57		0.63	0.00	0.0	0.00	0.0
NOV	2.26	1.70	0.89		0.81	0.00	0.0	0.00	0.0
DEC	0.84	0.59	0.99	0.40		0.40	10.0	0.40	6.7

SOUTHERN TEXAS (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.66	0.46	0.85	0.39		0.65	16.3	0.65	10.8
FEB	1.32	0.92	0.99	0.07		0.72	18.0	0.72	12.0
MAR	2.80	2.10	0.81		1.29	0.00	0.0	0.00	0.0
APR	4.48	3.36	1.36		2.00	0.00	0.0	0.00	0.0
MAY	5.48	4.11	2.13		1.98	0.00	0.0	0.00	0.0
JUN	6.36	5.09	1.14		3.95	0.00	0.0	0.00	0.0
JUL	6.80	5.44	0.00		5.44	0.00	0.0	0.00	0.0
AUG	6.86	5.49	0.69		3.79	0.00	0.0	0.00	0.0
SEP	5.88	4.41	1.90		2.51	0.00	0.0	0.00	0.0
OCT	4.36	3.27	2.57		0.70	0.00	0.0	0.00	0.0
NOV	2.46	1.85	0.75		1.10	0.00	0.0	0.00	0.0
DEC	1.04	0.73	0.99	0.26		0.26	6.5	0.26	4.3

SOUTHERN TEXAS (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.86	0.60	0.75	0.15		0.27	6.8	0.27	4.5
FEB	1.52	1.06	0.90		0.16	0.11	2.8	0.11	1.8
MAR	3.00	2.25	0.81		1.44	0.00	0.0	0.00	0.0
APR	4.68	3.51	1.19		2.32	0.00	0.0	0.00	0.0
MAY	5.68	4.26	1.78		2.48	0.00	0.0	0.00	0.0
JUN	6.56	5.25	0.60		4.65	0.00	0.0	0.00	0.0
JUL	7.00	5.60	0.00		5.60	0.00	0.0	0.00	0.0
AUG	7.06	5.65	0.12		5.53	0.00	0.0	0.00	0.0
SEP	6.08	4.56	1.35		3.21	0.00	0.0	0.00	0.0
OCT	4.56	3.42	2.57		0.85	0.00	0.0	0.00	0.0
NOV	2.66	2.00	0.62		1.38	0.00	0.0	0.00	0.0
DEC	1.24	0.87	0.99	0.12		0.12	3.0	0.12	2.0

SOUTHERN TEXAS (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.46	0.32	0.94	0.62		1.02	25.5	1.02	17.0
FEB	1.12	0.78	1.09	0.31		1.33	33.3	1.33	22.2
MAR	2.40	1.80	0.81		0.99	0.34	8.5	0.34	5.7
APR	4.08	3.06	1.72		1.34	0.00	0.0	0.00	0.0
MAY	5.08	3.81	2.84		0.97	0.00	0.0	0.00	0.0
JUN	5.76	4.61	2.75		1.86	0.00	0.0	0.00	0.0
JUL	6.20	4.96	1.48		3.48	0.00	0.0	0.00	0.0
AUG	6.26	5.01	2.34		2.67	0.00	0.0	0.00	0.0
SEP	5.48	4.11	2.99		1.12	0.00	0.0	0.00	0.0
OCT	3.96	2.97	2.57		0.40	0.00	0.0	0.00	0.0
NOV	2.06	1.55	1.02		0.53	0.00	0.0	0.00	0.0
DEC	0.64	0.59	0.99		0.40	0.40	10.0	0.40	6.7

SOUTHERN TEXAS (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.66	0.46	0.85	0.39		0.65	16.3	0.65	10.8
FEB	1.32	0.92	0.99	0.07		0.72	18.0	0.72	12.0
MAR	2.60	1.95	0.81		1.14	0.00	0.0	0.00	0.0
APR	4.28	3.21	1.54		1.67	0.00	0.0	0.00	0.0
MAY	5.28	3.96	2.48		1.48	0.00	0.0	0.00	0.0
JUN	5.96	4.77	2.22		2.55	0.00	0.0	0.00	0.0
JUL	6.40	5.12	0.92		4.20	0.00	0.0	0.00	0.0
AUG	6.46	5.17	1.82		3.35	0.00	0.0	0.00	0.0
SEP	5.68	4.26	2.44		1.82	0.00	0.0	0.00	0.0
OCT	4.26	3.20	2.57		0.63	0.00	0.0	0.00	0.0
NOV	2.26	1.70	0.89		0.81	0.00	0.0	0.00	0.0
DEC	1.04	0.73	0.99	0.26		0.26	6.5	0.26	4.3

SOUTHERN TEXAS (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	0.86	0.60	0.75	0.15		0.27	6.8	0.27	4.5
FEB	1.52	1.06	0.90		0.16	0.11	2.8	0.11	1.8
MAR	2.80	2.10	0.81		1.29	0.00	0.0	0.00	0.0
APR	4.48	3.36	1.36		2.00	0.00	0.0	0.00	0.0
MAY	5.48	4.11	2.13		1.98	0.00	0.0	0.00	0.0
JUN	6.16	4.93	1.68		3.25	0.00	0.0	0.00	0.0
JUL	6.60	5.28	0.37		4.91	0.00	0.0	0.00	0.0
AUG	6.66	5.33	1.25		4.08	0.00	0.0	0.00	0.0
SEP	5.88	4.41	1.90		2.51	0.00	0.0	0.00	0.0
OCT	4.36	3.27	2.57		0.70	0.00	0.0	0.00	0.0
NOV	2.46	1.85	0.75		1.10	0.00	0.0	0.00	0.0
DEC	1.24	0.87	0.99	0.12		0.12	3.0	0.12	2.0

SOUTHERN (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	1.06	0.74	0.66		0.08	0.00	0.0	0.00	0.0
FEB	1.72	1.20	0.80		0.40	0.00	0.0	0.00	0.0
MAR	3.00	2.25	0.81		1.44	0.00	0.0	0.00	0.0
APR	4.68	3.51	1.19		2.32	0.00	0.0	0.00	0.0
MAY	5.68	4.26	1.78		2.48	0.00	0.0	0.00	0.0
JUN	6.36	5.09	1.14		3.95	0.00	0.0	0.00	0.0
JUL	6.80	5.44	0.00		5.44	0.00	0.0	0.00	0.0
AUG	6.86	5.49	0.69		3.79	0.00	0.0	0.00	0.0
SEP	6.08	4.56	1.35		3.21	0.00	0.0	0.00	0.0
OCT	4.56	3.42	2.57		0.86	0.00	0.0	0.00	0.0
NOV	2.66	2.00	0.67		1.38	0.00	0.0	0.00	0.0
DEC	1.44	1.01	0.99		0.02	0.00	0.0	0.00	0.0

LOWER VALLEY (CONTROL)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.28	1.60	1.53		0.07	0.00	0.0	0.00	0.0
FEB	2.93	2.05	1.42		0.63	0.00	0.0	0.00	0.0
MAR	4.02	3.02	0.77		2.25	0.00	0.0	0.00	0.0
APR	5.14	3.86	1.46		2.40	0.00	0.0	0.00	0.0
MAY	5.86	4.40	2.80		1.60	0.00	0.0	0.00	0.0
JUN	6.51	5.21	2.77		2.44	0.00	0.0	0.00	0.0
JUL	6.88	5.50	1.54		3.96	0.00	0.0	0.00	0.0
AUG	6.99	5.59	2.53		3.06	0.00	0.0	0.00	0.0
SEP	6.38	4.79	4.65		0.14	0.00	0.0	0.00	0.0
OCT	5.32	3.99	2.76		1.23	0.00	0.0	0.00	0.0
NOV	3.86	2.90	1.31		1.59	0.00	0.0	0.00	0.0
DEC	2.76	1.93	1.09		0.84	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 1°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.46	1.72	1.36		0.36	0.00	0.0	0.00	0.0
FEB	3.11	2.18	1.42		0.76	0.00	0.0	0.00	0.0
MAR	4.20	3.15	0.77		2.38	0.00	0.0	0.00	0.0
APR	5.32	3.99	1.46		2.53	0.00	0.0	0.00	0.0
MAY	6.04	4.53	2.42		2.11	0.00	0.0	0.00	0.0
JUN	6.69	5.35	1.91		3.44	0.00	0.0	0.00	0.0
JUL	7.06	5.65	0.76		4.89	0.00	0.0	0.00	0.0
AUG	7.17	5.74	1.58		4.16	0.00	0.0	0.00	0.0
SEP	6.56	4.92	3.18		1.74	0.00	0.0	0.00	0.0
OCT	5.50	4.13	2.76		1.37	0.00	0.0	0.00	0.0
NOV	4.04	3.03	1.23		1.80	0.00	0.0	0.00	0.0
DEC	2.94	2.06	1.01		1.05	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 2°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.64	1.85	1.24		0.61	0.00	0.0	0.00	0.0
FEB	3.29	2.30	1.42		0.88	0.00	0.0	0.00	0.0
MAR	4.38	3.29	0.77		2.52	0.00	0.0	0.00	0.0
APR	5.50	4.13	1.46		2.67	0.00	0.0	0.00	0.0
MAY	5.86	4.40	2.06		2.34	0.00	0.0	0.00	0.0
JUN	6.87	5.50	1.04		4.46	0.00	0.0	0.00	0.0
JUL	7.24	5.79	0.03		5.76	0.00	0.0	0.00	0.0
AUG	7.35	5.88	0.68		5.20	0.00	0.0	0.00	0.0
SEP	6.74	5.06	2.00		3.06	0.00	0.0	0.00	0.0
OCT	5.68	4.26	2.76		1.50	0.00	0.0	0.00	0.0
NOV	4.22	3.17	1.13		2.04	0.00	0.0	0.00	0.0
DEC	3.12	2.18	0.92		1.26	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 3°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.82	1.97	1.12		0.85	0.00	0.0	0.00	0.0
FEB	3.47	2.43	1.42		1.01	0.00	0.0	0.00	0.0
MAR	4.56	3.42	0.77		2.65	0.00	0.0	0.00	0.0
APR	5.68	4.26	1.46		2.80	0.00	0.0	0.00	0.0
MAY	6.40	4.80	1.70		3.10	0.00	0.0	0.00	0.0
JUN	7.05	5.64	0.18		5.46	0.00	0.0	0.00	0.0
JUL	7.42	5.94	0.00		5.94	0.00	0.0	0.00	0.0
AUG	7.53	6.03	0.00		6.03	0.00	0.0	0.00	0.0
SEP	6.92	5.19	0.88		4.31	0.00	0.0	0.00	0.0
OCT	5.86	4.39	2.76		1.63	0.00	0.0	0.00	0.0
NOV	4.40	3.30	1.03		2.27	0.00	0.0	0.00	0.0
DEC	3.30	2.31	0.82		1.49	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 4°F UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	3.00	2.10	1.00		1.10	0.00	0.0	0.00	0.0
FEB	3.65	2.56	1.42		1.14	0.00	0.0	0.00	0.0
MAR	4.74	3.56	0.77		2.79	0.00	0.0	0.00	0.0
APR	5.86	4.40	1.46		2.94	0.00	0.0	0.00	0.0
MAY	6.58	4.94	1.33		3.61	0.00	0.0	0.00	0.0
JUN	7.23	5.78	0.00		5.78	0.00	0.0	0.00	0.0
JUL	7.60	6.08	0.00		6.08	0.00	0.0	0.00	0.0
AUG	7.71	6.17	0.00		6.17	0.00	0.0	0.00	0.0
SEP	7.10	5.33	0.00		5.33	0.00	0.0	0.00	0.0
OCT	6.04	4.53	2.76		1.77	0.00	0.0	0.00	0.0
NOV	4.58	3.44	0.93		2.51	0.00	0.0	0.00	0.0
DEC	3.48	2.44	0.73		1.71	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 1°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.64	1.85	1.24		0.61	0.00	0.0	0.00	0.0
FEB	3.29	2.30	1.42		0.88	0.00	0.0	0.00	0.0
MAR	4.20	3.15	0.77		2.38	0.00	0.0	0.00	0.0
APR	5.32	3.99	1.46		2.53	0.00	0.0	0.00	0.0
MAY	6.04	4.53	2.42		2.11	0.00	0.0	0.00	0.0
JUN	6.51	5.21	2.77		2.44	0.00	0.0	0.00	0.0
JUL	6.88	5.50	1.54		3.96	0.00	0.0	0.00	0.0
AUG	6.99	5.59	2.53		3.06	0.00	0.0	0.00	0.0
SEP	6.56	4.92	3.18		1.74	0.00	0.0	0.00	0.0
OCT	5.58	4.13	2.76		1.37	0.00	0.0	0.00	0.0
NOV	4.04	3.03	1.23		1.80	0.00	0.0	0.00	0.0
DEC	3.12	2.18	0.92		1.26	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 2°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	2.82	1.97	1.12		0.85	0.00	0.0	0.00	0.0
FEB	3.47	2.43	1.42		1.01	0.00	0.0	0.00	0.0
MAR	4.38	3.29	0.77		2.52	0.00	0.0	0.00	0.0
APR	5.50	4.13	1.46		2.67	0.00	0.0	0.00	0.0
MAY	5.86	4.40	2.06		2.34	0.00	0.0	0.00	0.0
JUN	6.69	5.35	1.91		3.44	0.00	0.0	0.00	0.0
JUL	7.06	5.65	0.76		4.89	0.00	0.0	0.00	0.0
AUG	7.17	5.74	1.58		4.16	0.00	0.0	0.00	0.0
SEP	6.74	5.06	2.00		3.06	0.00	0.0	0.00	0.0
OCT	5.68	4.26	2.76		1.50	0.00	0.0	0.00	0.0
NOV	4.22	3.17	1.13		2.04	0.00	0.0	0.00	0.0
DEC	3.30	2.31	0.82		1.49	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 3°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	3.00	2.10	1.00		1.10	0.00	0.0	0.00	0.0
FEB	3.65	2.56	1.42		1.14	0.00	0.0	0.00	0.0
MAR	4.56	3.42	0.77		2.65	0.00	0.0	0.00	0.0
APR	5.68	4.26	1.46		2.80	0.00	0.0	0.00	0.0
MAY	6.40	4.80	1.70		3.10	0.00	0.0	0.00	0.0
JUN	6.87	5.50	1.04		4.46	0.00	0.0	0.00	0.0
JUL	7.24	5.79	0.03		5.76	0.00	0.0	0.00	0.0
AUG	7.35	5.88	0.68		5.20	0.00	0.0	0.00	0.0
SEP	6.92	5.19	0.88		4.31	0.00	0.0	0.00	0.0
OCT	5.86	4.39	2.76		1.63	0.00	0.0	0.00	0.0
NOV	4.40	3.30	1.03		2.27	0.00	0.0	0.00	0.0
DEC	3.48	2.44	0.73		1.71	0.00	0.0	0.00	0.0

LOWER VALLEY (+ 4°F NON-UNIFORM)

MONTH	ME ₀	PET	PRECIP	SURP	DEF	SM 4	%SM 4	SM 6	% SM 6
JAN	3.18	2.22	0.88		1.34	0.00	0.0	0.00	0.0
FEB	3.83	2.68	1.42		1.26	0.00	0.0	0.00	0.0
MAR	4.74	3.56	0.77		2.79	0.00	0.0	0.00	0.0
APR	5.86	4.40	1.46		2.94	0.00	0.0	0.00	0.0
MAY	6.58	4.94	1.33		3.61	0.00	0.0	0.00	0.0
JUN	7.05	5.64	0.18		5.46	0.00	0.0	0.00	0.0
JUL	7.42	5.94	0.00		5.94	0.00	0.0	0.00	0.0
AUG	7.53	6.03	0.00		6.03	0.00	0.0	0.00	0.0
SEP	7.10	5.33	0.00		5.33	0.00	0.0	0.00	0.0
OCT	6.04	4.53	2.76		1.77	0.00	0.0	0.00	0.0
NOV	4.58	3.44	0.93		2.51	0.00	0.0	0.00	0.0
DEC	3.66	2.56	0.63		1.93	0.00	0.0	0.00	0.0

VITA

Brian Matthew Bjornson [REDACTED]

As the son of an active duty Air Force officer, Brian attended three different high schools during a four year period. He graduated in the top 3% of over three hundred high school seniors from David Crockett High School in Austin, Texas.

Brian received a Reserve Officer Training Corps (ROTC) scholarship from the University of Texas at Austin and graduated with a Bachelor of Science degree in Engineering Science in 1983. Upon graduation, he was commissioned a Second Lieutenant in the United States Air Force. His first assignment was to Barksdale Air Force Base (AFB) in Bossier City, Louisiana where he held positions as duty forecaster, Wing Weather Officer, and Weather Support Unit forecaster. In 1985, Brian was assigned to Chanute AFB, Illinois where he worked as an instructor and instructor supervisor at the Air Force, Navy, and Marine Corps only weather training school. In 1987, he was promoted to the rank of Captain and offered a regular commission in the USAF. Capt. Bjornson is presently assigned to the U.S. Air Force Institute of Technology and is on assignment at Texas A&M University to obtain a Master of Science Degree in Meteorology. Upon graduation in May of 1990, he will be assigned to the Environmental Technical Applications Center at Scott AFB, IL.

Brian is married to the former Donna Lisbeth Marquardt of Calgary, Canada. [REDACTED]
[REDACTED]